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Figure 1

Gene Cluster for Production of Compound 2(a)

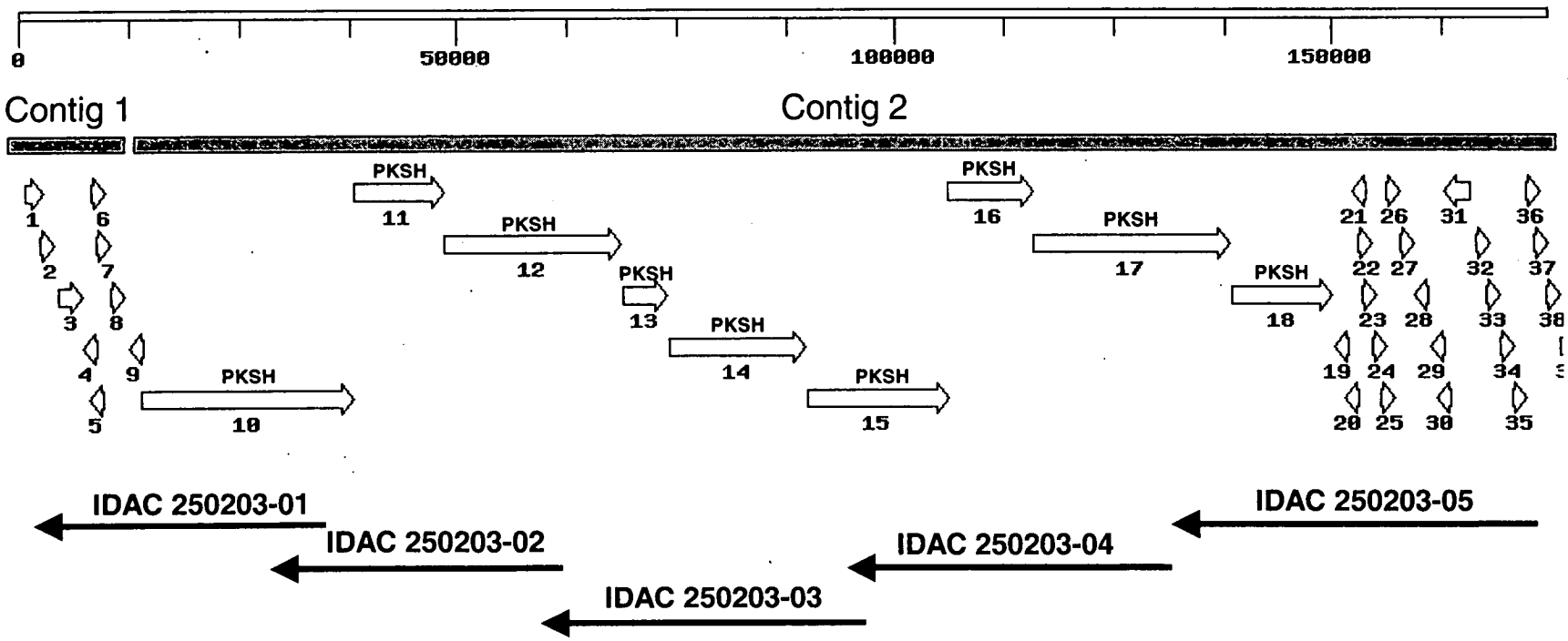

Figure 2a

```
ORF10_pKS01          PIAIVGIGCHFPGGVQSPEALWNLVETGTDAISAFPTGRGWDLDALYDPDPDRAGTSYAR
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ORF10_pKS03          PIAIVSMSCRFPGGVRTPEDLWRLLVDGTDAVGAFPADRGWDLDRLYSPDPDQPGTSYTR
ORF10_pKS04          PIVIVGMGCRFPGGVRSPEDLWQLVATGGDGITGFPSDRGWNVEALYHPDPDHAGTSYTR
ORF10_pKS05          PIAIVAMSCRFPGGVRTPEDLWRLLSTGGDAIGEFPADRGWDLSRLYSPDPDKQGTFYAR
ORF11_pKS01          PIAIVAMSCRFPNGVGSPEDLWRLVDEGGDAITGFPADRGWDIESLADPDPDRKGTFYNT
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ORF12_pKS01          PIAIVGMSCRFPGGVSSPEDLWRLVESGGDAISGFPVNRGWDIESLYDPDPDHEGTTYAR
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ORF12_pKS03          PIAIVSMSCRFPGGVRTPEDLWELLSTGGDAISDLPLDRGWDIDALYDADPSTQGTSYAR
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ORF14_pKS03          PIAIVAMSCRYPGDVRTPEDLWQLLTAGADGITRLPENRGWDTEGLYDPDPESQGTSYAR
ORF15_pKS01          PIAVVAMSCRYPGGIDTPEKLWDLVAHGRDAVSAYPTDRGWDAEVLFDPDPETGIEAYEQ
ORF15_pKS02          PIAIVAMSCRYPGGVTTPEELWQLLAGGGDAISGFPADRGWDVESLYDPDPDHPGTSYTR
ORF15_pKS03          PIAIVGLGCRYPGGVESPDDLWRLVLEGRDAITEFPEDRGWDVDALFDADPDQQGTSYAR
ORF16_pKS01          PIAIVAMSCRYPGGVRSPEDLWRLVENGDDAVSGFPVDRGWDVEALYDADPDSSGSSYVS
ORF16_pKS02          PIAIVAMSCRFPGGVRNPEELWQLLTSEGDGLSQFPLDRGWDVDALYDPNPDAQGTSYTR
ORF17_pKS01          PIAIVGMSCRFPGGIESPEGLWDLVAGGRDAITDFPTDRGWDIESLYDADPDQQGTSYTR
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ORF17_pKS04          PIAIVGMSCRYPGGVETPEDLWRLVVGGGDAISEFPQGRGWDLESLYDPDPDGKGTSYTR
ORF18_pKS01          PIAIVGMSCRYPGDVESPEDLWRLVSEETDAISPFPTDRGWDMGRLFDADPDGRGTSYVQ
ORF18_pKS02          PIAIVAMSCRFPGGVRSPEDLWGLVLDGRDAISDMPDDRGWDVEGLFDPDPDRPGTSYSR
                     **.:..:.*::*..: .*: ** *:    * :   * .***:   :

ORF10_pKS01          EGGFLHDADAFDAAFFGISPREALAMDPQQRLLLEASWEAFDRAGVDPAALRGGQVGVFV
ORF10_pKS02          EGGFLYDAADFDADFFGISPREALAMDPQQRLLLETAWETFERAGIDPASLRGSQAGVFV
ORF10_pKS03          EGGFFDGAADFDPGFFGISPREALAMDPQQRLLLETSWEAIERAGIDPSSLRGSQAGVFV
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ORF14_pKS03          DGGFLHDAAEFDASFFGISPREALAMDPQQRLLLETTWEVFERAGIAPSAVRGSRTGVFA
ORF15_pKS01          VGGFLHDAADFDPAFFGISPREALAMDPQQRLLLETSWEAFERAGIDPATLRGSRTGVFA
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ORF17_pKS03          EGGFFYDAHHFDPAFFGINPREALAMDPQQRLLLETSWEAFERAGIDPTGLRGKQVGVFV
ORF17_pKS04          SGGFLHDAGRFDPAFFGISPREAVAMDPQQRLLLETSWEAFERAGIDPASMRGSRTGVFA
ORF18_pKS01          EGGFLHSANRFDPAFFGISPREAVAMDPQQRLLLETSWEAFERAGIDPTSLRGSRTGVFA
ORF18_pKS02          AGGFLHDAHHFDPTFFGISPREALATDPQQRLLLETSWEAFERAGIDPATVRGSRTGVFA
                      ***.     **.  ***.***::. **:** ***::**.:::**: .  :** : .*:
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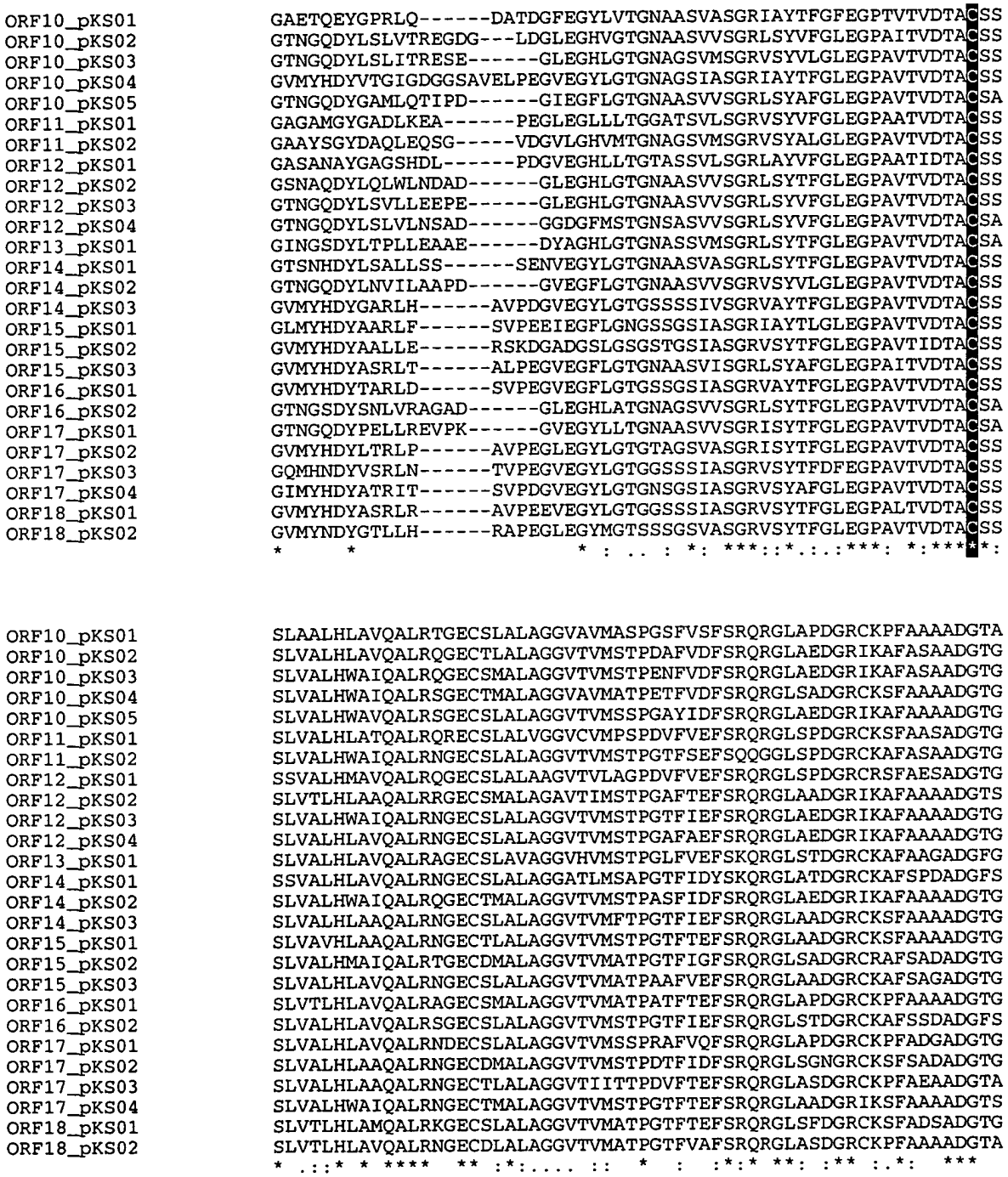
Figure 2b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ORF10_pKS04 GVMYHDYVTGIGDGGSAVELPEGVEGYLGTGNAGSIASGRIAYTFGLEGPAVTVDTACSS
ORF10_pKS05 GTNGQDYGAMLQTIPD------GIEGFLGTGNAASVVSGRLSYAFGLEGPAVTVDTACSA
ORF11_pKS01 GAGAMGYGADLKEA------PEGLEGLLLTGGATSVLSGRVSYVFGLEGPAATVDTACSS
ORF11_pKS02 GAAYSGYDAQLEQSG-----VDGVLGHVMTGNAGSVMSGRVSYALGLEGPAVTVDTACSS
ORF12_pKS01 GASANAYGAGSHDL------PDGVEGHLLTGTASSVLSGRLAYVFGLEGPAATIDTACSS
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ORF14_pKS03 GVMYHDYGARLH------AVPDGVEGYLGTGSSSSIVSGRVAYTFGLEGPAVTVDTACSS
ORF15_pKS01 GLMYHDYAARLF------SVPEEIEGFLGNGSSGSIASGRIAYTLGLEGPAVTVDTACSS
ORF15_pKS02 GVMYHDYAALLE------RSKDGADGSLGSGSTGSIASGRVSYTFGLEGPAVTIDTACSS
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ORF17_pKS02 GVMYHDYLTRLP------AVPEGLEGYLGTGTAGSVASGRISYTFGLEGPAVTVDTACSS
ORF17_pKS03 GQMHNDYVSRLN------TVPEGVEGYLGTGGSSSIASGRVSYTFDFEGPAVTVDTACSS
ORF17_pKS04 GIMYHDYATRIT------SVPDGVEGYLGTGNSGSIASGRVSYAFGLEGPAVTVDTACSS
ORF18_pKS01 GVMYHDYASRLR------AVPEEVEGYLGTGGSSSIASGRVSYTFGLEGPALTVDTACSS
ORF18_pKS02 GVMYNDYGTLLH------RAPEGLEGYMGTSSSGSVASGRVSYTFGLEGPAVTVDTACSS

ORF10_pKS01 SLAALHLAVQALRTGECSLALAGGVAVMASPGSFVSFSRQRGLAPDGRCKPFAAAADGTA
ORF10_pKS02 SLVALHLAVQALRQGECTLALAGGVTVMSTPDAFVDFSRQRGLAEDGRIKAFASAADGTG
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ORF10_pKS04 SLVALHWAIQALRSGECTMALAGGVAVMATPETFVDFSRQRGLSADGRCKSFAAAADGTG
ORF10_pKS05 SLVALHWAVQALRSGECSLALAGGVTVMSSPGAYIDFSRQRGLAEDGRIKAFAAAADGTG
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ORF11_pKS02 SLVALHWAIQALRNGECSLALAGGVTVMSTPGTFSEFSQQGGLSPDGRCKAFASAADGTG
ORF12_pKS01 SSVALHMAVQALRQGECSLALAAGVTVLAGPDVFVEFSRQRGLSPDGRCRSFAESADGTG
ORF12_pKS02 SLVTLHLAAQALRRGECSMALAGAVTIMSTPGAFTEFSRQRGLAADGRIKAFAAAADGTS
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ORF14_pKS03 SLVALHLAAQALRNGECSLALAGGVTVMFTPGTFIEFSRQRGLAADGRCKSFAAAADGTG
ORF15_pKS01 SLVAVHLAAQALRNGECTLALAGGVTVMSTPGTFTEFSRQRGLAADGRCKSFAAAADGTG
ORF15_pKS02 SLVALHMAIQALRTGECDMALAGGVTVMATPGTFIGFSRQRGLSADGRCRAFSADADGTG
ORF15_pKS03 SLVALHLAVQALRNGECSLALAGGVTVMATPAAFVEFSRQRGLAADGRCKAFSAGADGTG
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ORF16_pKS02 SLVALHLAVQALRSGECSLALAGGVTVMSTPGTFIEFSRQRGLSTDGRCKAFSSDADGFS
ORF17_pKS01 SLVALHLAVQALRNDECSLALAGGVTVMSSPRAFVQFSRQRGLAPDGRCKPFADGADGTG
ORF17_pKS02 SLVALHLAAQALRNGECDMALAGGVTVMSTPDTFIDFSRQRGLSGNGRCKSFSADADGTG
ORF17_pKS03 SLVALHLAAQALRNGECTLALAGGVTIITTPDVFTEFSRQRGLASDGRCKPFAEAADGTA
ORF17_pKS04 SLVALHWAIQALRNGECTMALAGGVTVMSTPGTFTEFSRQRGLAADGRIKSFAAAADGTS
ORF18_pKS01 SLVTLHLAMQALRKGECSLALAGGVTVMATPGTFTEFSRQRGLSFDGRCKSFADSADGTG
ORF18_pKS02 SLVTLHLAVQALRNGECDLALAGGVTVMATPGTFVAFSRQRGLASDGRCKPFAAAADGTA

Figure 2c

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ORF10_pKS01          WGEGVGMLLVERLSDARAKGHRILAVVRGSAINQDGASNGLTAPSGPSQQRVIRQALANA
ORF10_pKS02          WGEGVGMLLVERLSDARRNGHPVLAVVRGSAINQDGASNGLTAPNGPSQQRVIRQALAGA
ORF10_pKS03          WGEGVGMLLVERLSDARRNGHPVLAVVRGSAVNQDGASNGLTAPNGPSQQRVIRAALASA
ORF10_pKS04          WAEGAGMLLVERLSDAERNGHPVLAVVRGSAINQDGASNGLTAPNGPSQQRVIREALASA
ORF10_pKS05          WGEGVGMLLVERLSDARRNGHPVLALVRGSAINQDGASNGLTAPNGPSQQRVIRQALANA
ORF11_pKS01          WSEGVGVLLVERLSDARRNGHPVLAVVRGSAVNQDGASNGLTAPNGPAQQRVIRQALENA
ORF11_pKS02          WGEGVGMLLVERLSDARRNGHPVLAVVRGSAVNQDGASNGLTAPNGPSQQRVIRAALASA
ORF12_pKS01          WSEGAGVLLVERLSDARRNGHHILAVVRGSAVNQDGASNGLTAPNGPAQQKVIRQALESA
ORF12_pKS02          WSEGVGLLLVERLSDARRNGHPVLAVVRGTAVNQDGASNGLTAPNGPSQQRVIREALADA
ORF12_pKS03          WGEGVGMLLVERLSDAERNGHPVLAIVRGSAINQDGASNGLTAPNGPSQQRVIRAALASA
ORF12_pKS04          WGEGVGMLLVERLSDARRNGHPVLALVRGSAVNQDGASNGLTAPNGPSQQRVIRAALASA
ORF13_pKS01          PAEGVGVLLLERLSDARKNGRPVLAVVRGSAVNQDGASNGLTAPNGPSQQRVIRQALANA
ORF14_pKS01          LAEGVGILLVERLSDARRKGHPVLAVVRGTAVNQDGASNGLTAPNGPSQQRVILQALSNA
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ORF15_pKS01          WGEGAGMLVLERLSEARRNGHPVLALVRGSAVNQDGASSGLTAPNGPSQQRVIRQALAGA
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ORF16_pKS01          WGEGVGMLLVERLSDAQRNGHPILAVVRGSAINQDGASNGLTAPNGPSQQRVIHQALTNA
ORF16_pKS02          PAEGVGVLLVERLSDARRNGHPILAVVRGSAINQDGASNGLTAPNGPSQQRVIRQALANA
ORF17_pKS01          WGEGVGMLLVERLSDARRNGHPVLALVRGSAINQDGASNGLTAPNGPSQQRVIRQALTNA
ORF17_pKS02          WAEGAGMILVERLSDARRNGHQVLAVVRGTAVNQDGASNGLTAPNGPSQQRVIRQALANA
ORF17_pKS03          WGEGVGMLLVERLSDARRNGHQVLAVVRGTAVNQDGASNGLTAPNGPSQQRVIRQALANA
ORF17_pKS04          WAEGAGMLLVERLSEARAKGHPVLAIVRGSAINQDGASNGLTAPNGPSQQRVIRQALAGA
ORF18_pKS01          WAEGAGMLLVERLSDARKNGHTVLAVVRGSAVNQDGASNGLTAPNGPSQQRVIRQALADA
ORF18_pKS02          WGEGVGMLLVERLSDARAKGHPVLAVVRGSAINQDGASNGLTAPNGPSQQRVIRQALASA
                      .**.*::::****:*. :*: :**:***:*:******.*****.**:**:**  ** ..

ORF10_pKS01          GLSAAEVDVVEAIGTGTRLGDPIEAQALLATYGQEHTDDRPLWLGSLKSNIGHTQAAAGV
ORF10_pKS02          GLSAADVDAVEAIGTGTRLGDPIEAQALLATYGQGRPADRPLWLGSVKSNIGHTQAAAGV
ORF10_pKS03          GLSAADVDVVEAIGTGTKLGDPIEAQALLATYGQDRPAGRPLWLGSIKSNIGHTQAAAGV
ORF10_pKS04          DLSAADIDAVEAIGTGTRLGDPIEAQALLATYGREREAGRPLWLGSIKSNIGHTQAAAGV
ORF10_pKS05          GLSAAEVDAVEAIGTGTRLGDPIEVQALLATYGREREADQPLWLGSIKSNIGHTQAAAGV
ORF11_pKS01          RLSAAEVDVVEAIGTGTTLGDPIEAQALLATYGQDRPEGRPLRLGSLKSNIGHTQAAAGV
ORF11_pKS02          GLSAADVDVVEAIGTGTKLGDPIEAQALLATYGQDRPDGRPLWLGSIKSNIGHTQAAAGV
ORF12_pKS01          RLTPADIDAVEAIGTGTTLGDPIEAQALLATYGQGRTDGRPLWLGSLKSNLGHTQNAAGV
ORF12_pKS02          GLSAAEVDAVEAIGTGTTLGDPIEAQALLATYGQGRPDDQPLWLGSVKSNIGHTQAVAGA
ORF12_pKS03          GLSAADVDAVEAIGTGTTLGDPIEAQALLATYGQDRPADRPLQLGSIKSNIGHTQAAAGV
ORF12_pKS04          GLAPGDIDAVEAIGTGTKLGDPIEAQALLATYGQDRPADRPLQLGSIKSNIGHTQAAAGV
ORF13_pKS01          RLSTDQVDVVEAIGTGTSLGDPIEAQALIATYGQDRPADQPLLLGSVKSNIGHTQAAAGV
ORF14_pKS01          RLTPDQVDAVEAIGTGTGLGDPIEAQALIATYGQDRPDGRPLWLGSLKTNIGHAQAAAGV
ORF14_pKS02          GLTTMDVDAVEAIGTGTKLGDPIEAQALLATYGQDRPEGRPLLLGSIKSNLGHTQAAAGV
ORF14_pKS03          GVAAGHVDAVEAIGTGTTLGDPIEAQALLATYGQEHTDDRPLLLGSVKSNLGHTQAASGV
ORF15_pKS01          RLSATQVDAVEAIGTGTTLGDPIEAQALLATYGQDRPDGRPLWLGSIKSNMGHTQAAAGI
ORF15_pKS02          GLSAAEVDAVEAIGTGTTLGDPIEAQALLATYGREHTEDSPLWLGSIKSNMGHTQAAAGV
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ORF16_pKS02          RLSAADVDVVEAIGTGTTLGDPIEAQALLATYGQDRPAGRPLLLGSIKSNIGHAQAAAGV
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ORF17_pKS02          GLTTAEVDVVEAIGTGTTLGDPIEAQALLATYGQDRPAGQPLRLGSIKSNIGHTQAAAGA
ORF17_pKS03          GLTAAEVDAVEAIGTGTRLGDPIEAQALLATYGQDRPEGSPLWLGSIKSNFGHTQAAAGV
ORF17_pKS04          RLTSDQIDVVEAIGTGTTLGDPIEAQALLATYGREREADQPLWLGSIKSNMGHTQAAAGV
ORF18_pKS01          RLTAADVDVVEAIGTGTTLGDPIEAQALLATYGREHTEDSPLWLGSVKSNLGHTQAAAGV
ORF18_pKS02          GLSAADVDVVEAIGTGTTLGDPIEAQALLATYGQEHTDDSPLWLGSIKSNFGHTQAAAGV
                      ::. .:*.*******  ******.***:****: :    ** ***:*:*:**:* .:*
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Figure 2d

```
ORF10_pKS01     AGIIKMIMAMRHGVLPRTLHVDAPTPHVDWEAGAVTLLTEAVEWPESDRPRRAGVSSFGM
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ORF10_pKS03     AGIIKMVLAMQHGVLPQTLHVDEPTPHVDWSAGEVTLLTEQTAWPTVDRPRRAGVSSFGI
ORF10_pKS04     AGIIKMVMAMRHGVLPQTLHVDEPSPQVDWEAGEVSLLTGAMPWPQTGRPRRAGVSSFGI
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ORF11_pKS01     AGIIKMVMAMRHGVLPQTLHVDEPTPNVDWTAGAVSLLTEPMPWPETGAPRRAAVSAFGV
ORF11_pKS02     AGIIKMVMAMRHGVLPRTLHVDEPTSHVDWSAGEVSLLSESAEWPLTERPRRAGVSSFGI
ORF12_pKS01     AGIIKMVMAMRHGVLPRTLHVDEPTSHVDWSTGAVALLTEPVEWPETGRPRRVGVSAFGV
ORF12_pKS02     AGIIKMVMAMRHGVLPQTLHIDEPTPYVDWSAGDIALLTEQRAWPETGRPRRAGVSSFGY
ORF12_pKS03     AGVIKMVLAMEHGVLPQSLHIDAPSPQVDWEAGDIALLTEQRQWPETGRPRRAGVSSFGF
ORF12_pKS04     AGLMKMVLAMQHGVLPQTLHVDEPTPHVDWSAGDIALLTERREWPETGRPRRAGISSFGV
ORF13_pKS01     AGVIKMVLAMQHGVLPQSLHIDEPSPHVDWESGAVSLLTEQTAWPETTHPRRAGVSSFGF
ORF14_pKS01     AGVIKSVMAMRHGVLPRTLHVDEPTPEVDWSAGDVSLLTEARPWPLGDQPRRIGVSSFGM
ORF14_pKS02     AGVMKMVLAMQHGVLPQTLHVDEPTPHVDWSAGDVALLADAVAWPETGRPRRAGVSSFGI
ORF14_pKS03     AGVIKMVMSMRHGVLPKTLHVDEPTPHVDWSAGAVSLLTEQTPWPETGRPRRAGVSSFGI
ORF15_pKS01     AGIIKMVMAMRHGILPKTLHVDEPTPNVDWSEGAVSLLTESVPWPETGAPRRAGVSSFGI
ORF15_pKS02     AGVIKMVLAIQHGVLPRTLHADRPSPHVDWSQGAVSLLTESVPWPETGRPRRAGVSSFGI
ORF15_pKS03     AGIIKIVQAMRHGVVPKTLHVDEPTPHVDWSAGAVSLLTEQVAWPETGRPRRAAISSFGF
ORF16_pKS01     ASIIKMVEAMRHGVVPKTLHLDEPTPHVDWEAGAVSLIGEKIAWPETGELRRAGVSSFGF
ORF16_pKS02     AGVMKMVLAMQHGVLPQSLHIAEPTPHVDWSAGEVALLTEERAWPETGRPWRAGVSSFGF
ORF17_pKS01     AGIIKMVLAMQHGVLPESLHIDQPSGNVDWAAGDVKLLTEAVPWPQTGQPRRAGVSSFGV
ORF17_pKS02     AGIIKMILAMRHGVMPPSLHIGEPSPHIDWTAGAVSLLTEAAEWPDAGRPRRAGISSFGV
ORF17_pKS03     AGIIKMVQAMHHGVLPKTLHVDAPSPHVDWSAGAVSLLTEQMAWPETGRPRRAGVSSFGM
ORF17_pKS04     AGIIKMIMAIRHGVLPKTLHVDEPTPHVDWEAGAVSLLTESVPWPETGRPRRAGVSSFGI
ORF18_pKS01     AGIIKMVMAIRHGRIPKTLHVDEPSTNVDWSAGAVSLLRESVEWPETGRPRRAAISSFGI
ORF18_pKS02     AGIIKMVQAMHHGVVPKTLHVDEPSPHVDWSAGAVSLLTEQMAWPETGRPRRAAISSFGI
                *.::* : ::.** :* :**   *:  :**  * : *:     **      * .:*:**

ORF10_pKS01     SGTNAHVIVEEP
ORF10_pKS02     SGTNAHTIIEEA
ORF10_pKS03     SGTNAHTIIEQA
ORF10_pKS04     SGTNAHTIIEQP
ORF10_pKS05     SGTNAHTVLEQA
ORF11_pKS01     SGTNAHTIIEQA
ORF11_pKS02     SGTNAHTIIEQA
ORF12_pKS01     SGTNVHTIIEQA
ORF12_pKS02     SGTNAHAVIEQA
ORF12_pKS03     SGTNAHTIIEQA
ORF12_pKS04     SGTNAHTILEQA
ORF13_pKS01     SGTNAHVIVEQA
ORF14_pKS01     SGTNAHIILESA
ORF14_pKS02     SGTNAHTIIEQA
ORF14_pKS03     SGTNAHAIIEQA
ORF15_pKS01     SGTNAHTILEQA
ORF15_pKS02     SGTNAHTIIEQA
ORF15_pKS03     SGTNAHAIIEQA
ORF16_pKS01     SGTNAHVIVEQA
ORF16_pKS02     SGTNAHAIIEQA
ORF17_pKS01     SGTNAHTVIEQA
ORF17_pKS02     SGTNAHVIIEQP
ORF17_pKS03     SGTNAHAIIELA
ORF17_pKS04     SGTNAHTIIEQA
ORF18_pKS01     SGTNAHTIIEQA
ORF18_pKS02     SGTNAHTIIEQA
                ****.* ::* .
```

Figure 3a

```
ORF10_pAT01     VLLPWALSAKTPEALRAQAR-------RLGTLIAAQP--HVTPL---DIGHSLATTRGRF
ORF10_pAT02     SVLPLLISAKSDAGLRAQSE-------QLATHLVGNP--DVPIG---DIAYSLTTGRSGL
ORF10_pAT03     LPLPYVLSAKSPEALRAQAS-------VLRTHLEATD--HNGPG-SDDLAFSLATARAHL
ORF10_pAT04     PVVPWVLSGKGEEALRAQAR-------QLQSYVLRAP--ELRPV---DIAGSLAVGRASF
ORF10_pAT05     GVMPWTLSAKSEAALRVQAE-------RLRTRIA-----SDPLLQPVDVAYSLATSRAAL
ORF11_pAT01     AVLPWTLSGRSTAALRAQAA-------RLLTTQGQDG--ATEPGRPLDIGYSLATTRAAL
ORF11_pAT02     GTVPYVLSAKSSDALRAQAR-------QLLAVVEAAE--SPRVA---DLAYSLATSRAGL
ORF12_pAT01     KALPWLLSAKGRDALRDRAA-------QLLAYAEEHP--DLRPV---DIAGSLAVGRPSF
ORF12_pAT02     PVLPLLVSGRTAPALRAQAERLRPAATALATGTVTNSG-ALEAL---DLGYSLATSRAAL
ORF12_pAT03     DFVPLMLSAKSDVALRAQAA-------SLRARLIAAP--DMRLS---DVGSTLTTGRSAF
ORF12_pAT04     AVSAWPLAGKTEAGLREQAE-------RLLAHIDAHS--ELR---PVDVGHSLATGRAAF
ORF13_pAT01     -VVPWVLSGKSAGALRAQAE-------RLSGFLAGASAVDVPSV---DVGWSLASSRAGL
ORF14_pAT01     GALPVVLSGRTEPALRAQAA-------ALHAHLAAHP--GLGIA---DLAFSQALTRAAL
ORF14_pAT02     GPQPWLLSAKTRDALHDQAR-------RLHAHAELNP--ELSPA---DLGLSLAAGRSAF
ORF14_pAT03     SSVPLIVSARGEDALRAQAR-------RLHAHVHADP--GLRAV---DLGLSLATTRSAL
ORF15_pAT01     VPPLWTLSAKSPAALRAQAG-------KLHAHLTAHP--GLRPG---DIAHSLAVGRTDF
ORF15_pAT02     SALPLQLAGRSAEALSAQAR-------ALSAHLT-----AHPDVPLADLAYSLATSRATF
ORF15_pAT03     GSLPWLLSAKGADALRDQAA-------RLRAHAIGHP--ELSLA---DIGYALATSRTAL
ORF16_pAT01     -VVPWVLSGKSAGALRAQAE-------RLSGWLAGASAAGVASV---DVGWSLASSRAGL
ORF16_pAT02     -VLPWTLTAKTEKALQGQAE-------RLLTQLT--TRSDLRLV---DVGHSLATTRTAL
ORF17_pAT01     GPVPVLVSGQSDAALRAQAE-------RLAAHLRAHPGLGADTGTLTDLGFSLATSRSSL
ORF17_pAT02     TPLPFALSGRTPAALRAQAA-------RLIGHLAPRP--EAAPA---DVALSLATTRTAL
ORF17_pAT03     AALPWNLSARTPDALRAQGE-------RLLSHLETHCE-THPETVLADIGHSLTTGRALF
ORF17_pAT04     RVLPFVLSAKSAGALRGQAV-------RLKAHVEASP--EVSGAGAVDVAYSLATRRAVF
ORF18_pAT01     PVLPWPVSARTEEALHAQAE-------RLLAHVR-----TNPDQAPVGVALSLATGRAAL
ORF18_pAT02     RVLPFVLSAKSAGALRGQAV-------RLKAHVEASP--EVSGAGAADVAYSLATRRAVF
                      ::.:   .*  :.          *                    .:. : :  *  :

ORF10_pAT01     EQRAIVLGDD---REAFLDALHALAEGN--------DTPSVVQGAA-APGKLAFLFTGQG
ORF10_pAT02     ETRAILVGDADN-RTGLAAALRSLAAGE--------QAPGLVQGTV-TEGGLAFLFTGQG
ORF10_pAT03     EHRAVLT-ADD--PQEFREALARLADGD--------PSPRITTGAV-SDGRTAFLFTGQG
ORF10_pAT04     EDRAAVV--AAD-REGLLAALAALADGG--------SATGAVEGSA-VGGKLAFLFTGQG
ORF10_pAT05     ERRAVVVATE---RDEFLAGLKALASGQ--------PAPGLVQGR-VTEGGLAFLFTGQG
ORF11_pAT01     EHRAVLL-GRT--EDDFAAALSALAEGA--------ESAGLVQGRV-TEGGLAFLFTGQG
ORF11_pAT02     DHRAALVADD---RENLTRALAALAADE--------QVPGLVRGTA-TGGGLAFLFTGQG
ORF12_pAT01     EDRAAVV-AAD--REGLLAGLAALADGG--------SATGLVKGSSQLVGKLAFLFTGQG
ORF12_pAT02     EHRAVLIGTPSD-GQALASRLDALAAGE--------QVPGLVQGTA-SGGGLAFLFTGQG
ORF12_pAT03     ERRAALV--AGG-REGLLAGLEALADGG--------SAAGLVEGSP-VSGKLAFLFTGQG
ORF12_pAT04     DHRAVLVAGDD--RSEFRRALAALASGE--------SVAQVVQGIARPDQQVAFLFTGQG
ORF13_pAT01     EHRAVVLG-------DHAAGVAAVASGV--------MAAGVVTGSV-VGGKTAFVFPGQG
ORF14_pAT01     DRRAAVVADD---RDALLAGLAALAEGR--------PSADVVEGSA-TDGKLAFLFTGQG
ORF14_pAT02     ERRAAVI-AAD--RDGLLAGLAALADGG--------AAAGLVEGSP-VAGKLAFLFTGQG
ORF14_pAT03     EQRAALVAGD---RAELLRGLDALARGE--------DTAGLVRGTA-REGQVAFLFTGQG
ORF15_pAT01     EHRAVLT-SADG-PVGLVRALEALADSAPEDTAPADRAPGVTRGRP-VAGKLAFLFTGQG
ORF15_pAT02     DHRAVLVATEGTTAATAVTALDALADRR--------TAPGLVRGTASKGGRTAFLFTGQG
ORF15_pAT03     DRRAAVVAGD---REEFLAGLAALAEGA--------TAAGLTEGSP-AGGKLAFLFTGQG
ORF16_pAT01     EHRAVVLG-------DHAAGVGAVASGV--------MAAGVVTGSV-VGGKTAFVFPGQG
ORF16_pAT02     DQRAVLIGRDRP---DYLGALTALAAGD--------TSPLLVQGAV-VGGKTAFVFPGQG
ORF17_pAT01     DRRAVLFGDR----DSLLADLSALAEGE--------QPAGPVLGAV-GEGKTAFLFTGQG
ORF17_pAT02     DRRAAVIAHD---RTELLAGLTALAEGH--------DSARLVQHTA-ADGRTAILFTGQG
ORF17_pAT03     EHRATVVAGD---RDGFRAGLAALAEGR--------TAAGLIQGSSSTGGRTAFLFTGQG
ORF17_pAT04     DHRAVVVAGD---REELLRSLAAVESEG--------AAAGVTRGAVG-GGKLAFLFTGQG
ORF18_pAT01     EHRAVVVATD---RETALADLAALASGE--------TSARVVLGEPGARGKTAFLFTGQG
ORF18_pAT02     DHRAVVVAGD---REELLRALAAVESEG--------TAAGVTRGTAG-GGKLAFLFTGQG
                : ** :               :  :              .                *::*.***
```

Figure 3b

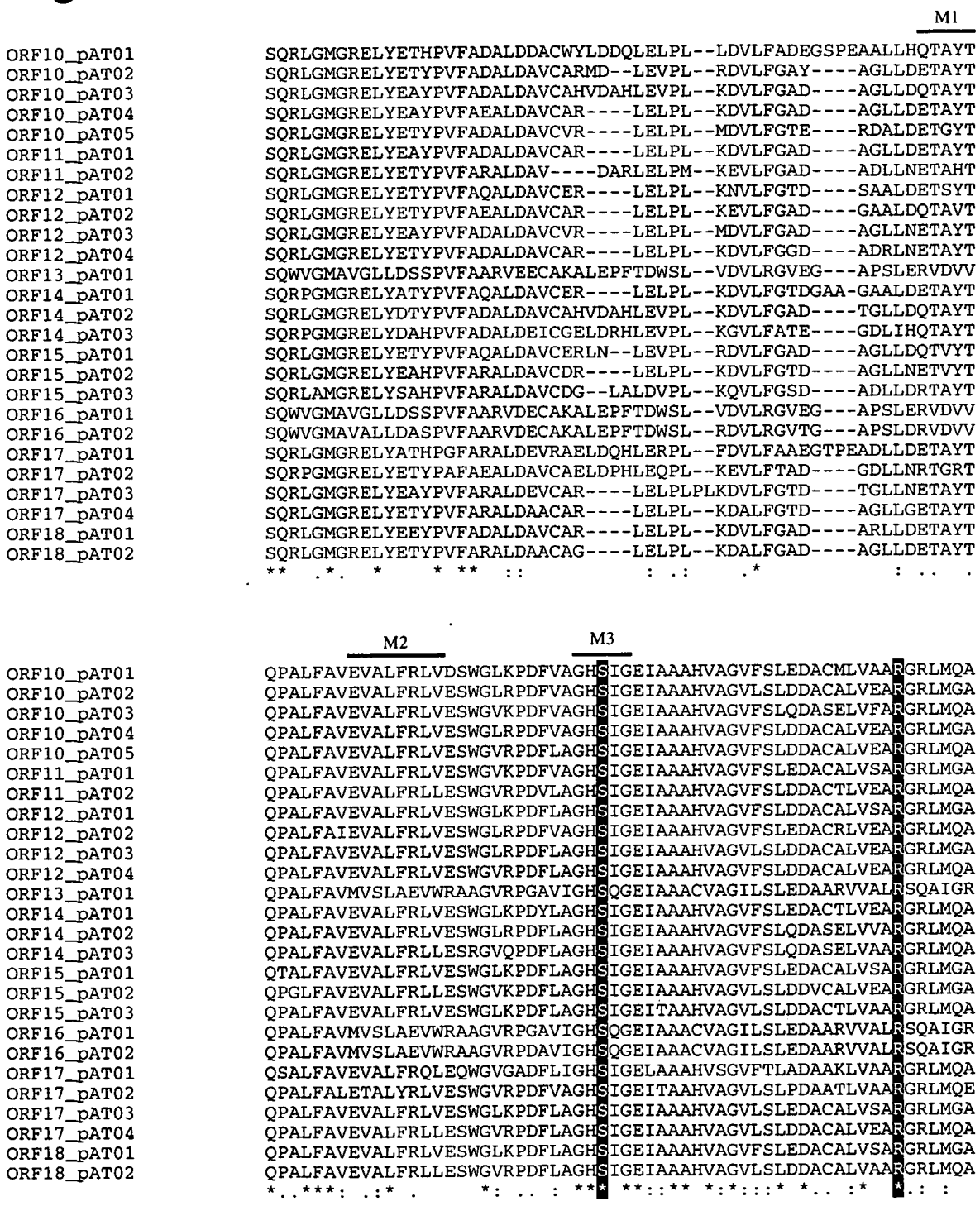
M1
ORF10_pAT01 SQRLGMGRELYETHPVFADALDDACWYLDDQLELPL--LDVLFADEGSPEAALLHQTAYT
ORF10_pAT02 SQRLGMGRELYETYPVFADALDAVCARMD--LEVPL--RDVLFGAY----AGLLDETAYT
ORF10_pAT03 SQRLGMGRELYEAYPVFADALDAVCAHVDAHLEVPL--KDVLFGAD----AGLLDQTAYT
ORF10_pAT04 SQRLGMGRELYEAYPVFAEALDAVCAR----LELPL--KDVLFGAD----AGLLDETAYT
ORF10_pAT05 SQRLGMGRELYETYPVFADALDAVCVR----LELPL--MDVLFGTE----RDALDETGYT
ORF11_pAT01 SQRLGMGRELYEAYPVFADALDAVCAR----LELPL--KDVLFGAD----AGLLDETAYT
ORF11_pAT02 SQRLGMGRELYETYPVFARALDAV----DARLELPM--KEVLFGAD----ADLLNETAHT
ORF12_pAT01 SQRLGMGRELYETYPVFAQALDAVCER----LELPL--KNVLFGTD----SAALDETSYT
ORF12_pAT02 SQRLGMGRELYETYPVFAEALDAVCAR----LELPL--KEVLFGAD----GAALDQTAVT
ORF12_pAT03 SQRLGMGRELYEAYPVFADALDAVCVR----LELPL--MDVLFGAD----AGLLNETAYT
ORF12_pAT04 SQRLGMGRELYETYPVFADALDAVCAR----LELPL--KDVLFGGD----ADRLNETAYT
ORF13_pAT01 SQWVGMAVGLLDSSPVFAARVEECAKALEPFTDWSL--VDVLRGVEG---APSLERVDVV
ORF14_pAT01 SQRPGMGRELYATYPVFAQALDAVCER----LELPL--KDVLFGTDGAA-GAALDETAYT
ORF14_pAT02 SQRLGMGRELYDTYPVFADALDAVCAHVDAHLEVPL--KDVLFGAD----TGLLDQTAYT
ORF14_pAT03 SQRPGMGRELYDAHPVFADALDEICGELDRHLEVPL--KGVLFATE----GDLIHQTAYT
ORF15_pAT01 SQRLGMGRELYETYPVFAQALDAVCERLN--LEVPL--RDVLFGAD----AGLLDQTVYT
ORF15_pAT02 SQRLGMGRELYEAHPVFARALDAVCDR----LELPL--KDVLFGTD----AGLLNETVYT
ORF15_pAT03 SQRLAMGRELYSAHPVFARALDAVCDG--LALDVPL--KQVLFGSD----ADLLDRTAYT
ORF16_pAT01 SQWVGMAVGLLDSSPVFAARVDECAKALEPFTDWSL--VDVLRGVEG---APSLERVDVV
ORF16_pAT02 SQWVGMAVALLDASPVFAARVDECAKALEPFTDWSL--RDVLRGVTG---APSLDRVDVV
ORF17_pAT01 SQRLGMGRELYATHPGFARALDEVRAELDQHLERPL--FDVLFAAEGTPEADLLDETAYT
ORF17_pAT02 SQRPGMGRELYETYPAFAEALDAVCAELDPHLEQPL--KEVLFTAD----GDLLNRTGRT
ORF17_pAT03 SQRLGMGRELYEAYPVFARALDEVCAR----LELPLPLKDVLFGTD----TGLLNETAYT
ORF17_pAT04 SQRLGMGRELYETYPVFARALDAACAR----LELPL--KDALFGTD----AGLLGETAYT
ORF18_pAT01 SQRLGMGRELYEEYPVFADALDAVCAR----LELPL--KDVLFGAD----ARLLDETAYT
ORF18_pAT02 SQRLGMGRELYETYPVFARALDAACAG----LELPL--KDALFGAD----AGLLDETAYT
M2
M3
ORF10_pAT01 QPALFAVEVALFRLVDSWGLKPDFVAGHSIGEIAAAHVAGVFSLEDACMLVAARGRLMQA
ORF10_pAT02 QPALFAVEVALFRLVESWGLRPDFVAGHSIGEIAAAHVAGVLSLDDACALVEARGRLMGA
ORF10_pAT03 QPALFAVEVALFRLVESWGVKPDFVAGHSIGEIAAAHVAGVFSLQDASELVFARGRLMQA
ORF10_pAT04 QPALFAVEVALFRLVESWGLRPDFVAGHSIGEIAAAHVAGVFSLDDACALVEARGRLMGA
ORF10_pAT05 QPALFAVEVALFRLVESWGVRPDFLAGHSIGEIAAAHVAGVFSLDDACALVEARGRLMQA
ORF11_pAT01 QPALFAVEVALFRLVESWGVKPDFVAGHSIGEIAAAHVAGVFSLEDACALVSARGRLMGA
ORF11_pAT02 QPALFAVEVALFRLLESWGVRPDVLAGHSIGEIAAAHVAGVFSLDDACTLVEARGRLMQA
ORF12_pAT01 QPALFAVEVALFRLVESWGLKPDFLAGHSIGEIAAAHVAGVFSLDDACALVSARGRLMGA
ORF12_pAT02 QPALFAIEVALFRLVESWGLRPDFVAGHSIGEIAAAHVAGVFSLEDACRLVEARGRLMQA
ORF12_pAT03 QPALFAVEVALFRLVESWGLRPDFLAGHSIGEIAAAHVAGVLSLDDACALVEARGRLMGA
ORF12_pAT04 QPALFAVEVALFRLVESWGVRPDFLAGHSIGEIAAAHVAGVFSLDDACALVEARGRLMQA
ORF13_pAT01 QPALFAVMVSLAEVWRAAGVRPGAVIGHSQGEIAAACVAGILSLEDAARVVALRSQAIGR
ORF14_pAT01 QPALFAVEVALFRLVESWGLKPDYLAGHSIGEIAAAHVAGVFSLEDACTLVEARGRLMQA
ORF14_pAT02 QPALFAVEVALFRLVESWGLRPDFLAGHSIGEIAAAHVAGVFSLQDASELVVARGRLMQA
ORF14_pAT03 QPALFAVEVALFRLLESRGVQPDFLAGHSIGEIAAAHVAGVFSLQDASELVAARGRLMQA
ORF15_pAT01 QTALFAVEVALFRLVESWGLKPDFLAGHSIGEIAAAHVAGVFSLEDACALVSARGRLMGA
ORF15_pAT02 QPGLFAVEVALFRLLESWGVKPDFLAGHSIGEIAAAHVAGVLSLDDVCALVEARGRLMGA
ORF15_pAT03 QPALFAVEVALFRLVESWGLKPDFLAGHSIGEITAAHVAGVLSLDDACTLVAARGRLMQA
ORF16_pAT01 QPALFAVMVSLAEVWRAAGVRPGAVIGHSQGEIAAACVAGILSLEDAARVVALRSQAIGR
ORF16_pAT02 QPALFAVMVSLAEVWRAAGVRPDAVIGHSQGEIAAACVAGILSLEDAARVVALRSQAIGR
ORF17_pAT01 QSALFAVEVALFRQLEQWGVGADFLIGHSIGELAAAHVSGVFTLADAAKLVAARGRLMQA
ORF17_pAT02 QPALFALETALYRLVESWGVRPDFVAGHSIGEITAAHVAGVLSLPDAATLVAARGRLMQE
ORF17_pAT03 QPALFAVEVALFRLVESWGLKPDFLAGHSIGEIAAAHVAGVLSLEDACALVSARGRLMGA
ORF17_pAT04 QPALFAVEVALFRLLESWGVRPDFLAGHSIGEIAAAHVAGVLSLDDACALVEARGRLMQA
ORF18_pAT01 QPALFAVEVALFRLVESWGLKPDFLAGHSIGEIAAAHVAGVFSLEDACALVSARGRLMGA
ORF18_pAT02 QPALFAVEVALFRLLESWGVRPDFLAGHSIGEIAAAHVAGVLSLDDACALVAARGRLMQA

Figure 3c

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ORF10_pAT01     LPAG-GVMIALQASEDEVLPLLT----DRVSIAAINGPQAVVIAGDEDAAAAIAETFQAA
ORF10_pAT02     LPGG-GVMIAVQAPEAEVLPLLT----ERVSIAAINGPQSVVIAGDEADAVAIVESFTG-
ORF10_pAT03     LPTG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFTD-
ORF10_pAT04     LPAG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPRSVVIAGDEADAVAIVESFTG-
ORF10_pAT05     LPTG-GVMIAVQASEAEVLPLLT----ERVSIAAINGPQSVVIAGDEADAVALVESFTG-
ORF11_pAT01     LPAG-GVMIAVQASEAEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAGSFAD-
ORF11_pAT02     LPTG-GVMIAVQASEDEVLPLLT----GQVSIAAINGPQSVVIAGDEADAVAIAESFTD-
ORF12_pAT01     LPGG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFAD-
ORF12_pAT02     LPGG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFTG-
ORF12_pAT03     LPAG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIVESFTG-
ORF12_pAT04     LPTG-GVMIAVQASEAEVLPLLT----ERVSIAAINGPQSVVIAGDEADAVAIVDAFND-
ORF13_pAT01     VLAGLGGMVSVPLPAKAVRELIAPWGEGRISVAAVNGPSSVVVSGEAAALDELLVSCESE
ORF14_pAT01     LPTG-GVMIAVEASEDEVLPLLT----DWVSIAAVNGPRSVVVAGDEDAAVAIAEAFAAQ
ORF14_pAT02     LPTG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFTG-
ORF14_pAT03     LPTG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFTD-
ORF15_pAT01     LPGG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFAD-
ORF15_pAT02     LPGG-GVMIAVQASEAEVLPLLT----DRVSIAAINGPRSVVIAGDEADAVAIVESFTD-
ORF15_pAT03     LPTG-GVMIAVEASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIAESFTG-
ORF16_pAT01     VLAGLGGMVSVPLPAKAVRELIAPWGEGRISVAAVNGPSSVVVSGEAAALDEMLASCESE
ORF16_pAT02     VLAGLGGMVSVALPAKAVRELIAPWGEDRISVAAVNGPSSVVVSGETAALDELLASCESD
ORF17_pAT01     LPAD-GAMIAVEATEDEVAPLLT----GRVSIAAVNGPRSVVVSGDEDAATALAETLRAR
ORF17_pAT02     LPEG-GAMIALTATEDEVLPLLAGH-EDRIGIAAVNSASSVVISGEEGLALEIAAEFERR
ORF17_pAT03     LPGG-GVMIAVQASEGEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIVESFSD-
ORF17_pAT04     LPTG-GVMIAVQASEAEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIVESFSG-
ORF18_pAT01     LPAG-GVMIAVQASEDEVLPLLT----ARVSIAAINGPQSVVIAGDEADAVAIVESFTG-
ORF18_pAT02     LPTG-GVMIAVQASEDEVLPLLT----DRVSIAAINGPQSVVIAGDEADAVAIVESFSG-
                :  . * *:::  .   *  *::      :.:**:*.. :**::*:      :

                          M4
ORF10_pAT01     GRKTKRLTVSHAFHSPHMDAMLEEFLRVAQVLDYAKPTLPVVSLLTGTTATPAELATPAY
ORF10_pAT02     -RKSKRLTVSHAFHSPHMDGMLEDFRAVAEGLSYEAPRIPVVSNLTGALVS-DEMGSAEF
ORF10_pAT03     -RKSKRLTVSHAFHSPHMDGMLDAFREIAEGLSYEPSRIPVVSNLTGALVS-DEMGSAEF
ORF10_pAT04     -RKSKRLTVSHAFHSPHMDGMLEDFRAVAEGLSYEAPRIPVVSNLTGTLVT-DEMGSAEF
ORF10_pAT05     -RKSKRLTVSHAFHSPHMDGMLADFRKVAEGLSYEAPRIPVVSNLTGALVT-DEMGSADF
ORF11_pAT01     -RKSKRLTVSHAFHSPHMDGMLEDFRLVAEGLSYEAPRIPVVSNLTGALVS-DEMGSAEF
ORF11_pAT02     -RKSKRLTVSHAFHSPHMDGMLADFRKVAEGLVYENPRIPIVSNLTGTLVT-DEMASADF
ORF12_pAT01     -RKSKRLTVSHAFHSPHMDGMLEDFRVVAEGLSYEAPRIPVVSNLTGALVS-DEMGSADF
ORF12_pAT02     -RKSKHLAVSHAFHSPHMDGMLEDFRAVAEGLSYEAPRIAVVSNLTGALVS-DEMSSAEF
ORF12_pAT03     -RKSKRLSVSHAFHSPHMDGMLEDFRVVAEGLSYDAPRIPVVSNLTGALVT-DEMGSADF
ORF12_pAT04     -RKSKRLAVSHAFHSPHMDGMLADFRKVAEELSYEAPRIPIVSNLTGALVT-DEMGSADF
ORF13_pAT01     GVRAKRIAVDYASHSAQVELLREELAELLAPIVPRAAEVPFLSTVTGEWVRGPELDGG-Y
ORF14_pAT01     GRKTKKLTVSHAFHSPHMDGMLDAFRTVAQGLSYGTPRIPVVSNLTGALVT-DEMGSADF
ORF14_pAT02     -RKSKRLTVSHAFHSPHMDGMLEDFRAVAEGLSYEAPRIPVVSNLTGALIS-DEMGSAEF
ORF14_pAT03     -RKSKRLTVSHAFHSPHMDGMLADFRKVAEGLVYENPRIPVVSNLTGALVT-DEMGSADF
ORF15_pAT01     -RKSKRLTVSHAFHSPHMDAMLEDFRAVAEGLSYEAPRIPVVSNLTGALVS-DEMGSADF
ORF15_pAT02     -RKSKRLTVSHAFHSPHMDGMLDAFREIAEGLSYEAPRIPVVSNLTGALVS-DEMGSADF
ORF15_pAT03     -RKSKRLTVSHAFHSPHMDGMLDAFREVAEGLSYGTPLIPVVSHLTGTLVT-DEMRSPDF
ORF16_pAT01     GVRAKRIAVDYASHSAQVELLREELAELLAPIVPRAAEVPFLSTVTGEWVRGPELDAG-Y
ORF16_pAT02     GVRAKRIAVDYASHSAQVELLREELAELLAPIVPRAAEVPFLSTVTGEWVRGPELDGG-Y
ORF17_pAT01     GRRTKRLTVSHAFHSPLMDGMLDAFREVAESVAYAPPVIPIVSNLTGASVTAEEICAADY
ORF17_pAT02     GRRTKRLTVSHAFHSPLMDGMLDAFREVAESLTYRAPAIPVVTLLTGTVAG-DELRTAEH
ORF17_pAT03     -RKSKRLTVSHAFHSPHMDGMLDDFRAVAEGLSYGAPRIPVVSNLTGALVS-DEMGSADF
ORF17_pAT04     -RKSKRLTVSHAFHSPHMDGMLAGFRKVAESLSYEAPRIPVVSNLTGALVT-DEMGSADF
ORF18_pAT01     -RKSKRLTVSHAFHSPHMDGMLEDFRVVAEGLSYEAPRIPVVSNLTGALVS-DEMGSADF
ORF18_pAT02     -RKSKRLTVSHAFHSPHMDGMLAGFRKVAESLSYEAPRIPVVSNLTGALVT-DEMGSADF
                  ::*:::*.:*  **. :: :   :  :   :    . :..:: :**      *:    .
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Figure 3d

```
ORF10_pAT01     WVRHVRDAVRYLDGVRTLHQRGVRTFLELGPDAVLTAMAQDCVDP-----QGAAFAPALR
ORF10_pAT02     WVRHVREAVRFLDGMRVLEAAGVTTYVELGPGGVLSALAQECVSG-----DGAAFVPVLR
ORF10_pAT03     WVRHVREAVRFLDGIRTLEAAGVTKYVELGPDGVLSAMAQDCVSG-----EGSVFIPVLR
ORF10_pAT04     WVRHVREAVRFLDGIRALEAAGVTTYVELGPGGVLSALAQECVSG-----DGAAFVPVLR
ORF10_pAT05     WVRHVREAVRFLDGTRTLEALGVTTYVELGPDGVLSAMAQECVTG-----EDSVFVPVLR
ORF11_pAT01     WVRHVREAVRFLDGIRTLEAAGVTKYVELGPDGVLSAMAQDCVSG-----EGSVFIPVLR
ORF11_pAT02     WVRHVREAVRFLDGIRALESRGVTTYIELGPDGVLSALAQDCLTAGTG-TGTAIFAPVLR
ORF12_pAT01     WVRHVRETVRFLDGIRTLEAAGVTKYVELGPDGVLSALAQDCVSG-----EDSVFIPVLR
ORF12_pAT02     WVRHVREAVRFLDGIRALEAAGVTTYVELGPGGVLSALAQECVSG-----DGAAFVPVLR
ORF12_pAT03     WVRHVREAVRFLDGIRALEAAGVTTYVELGPDGVLSAMAQECVTE-----GGAAFVPVLR
ORF12_pAT04     WVRHVREAVRFLDGIRALEAAGVTVYVELGPDGVLSAMAQECVTG-----EGAAFVPALR
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Figure 4

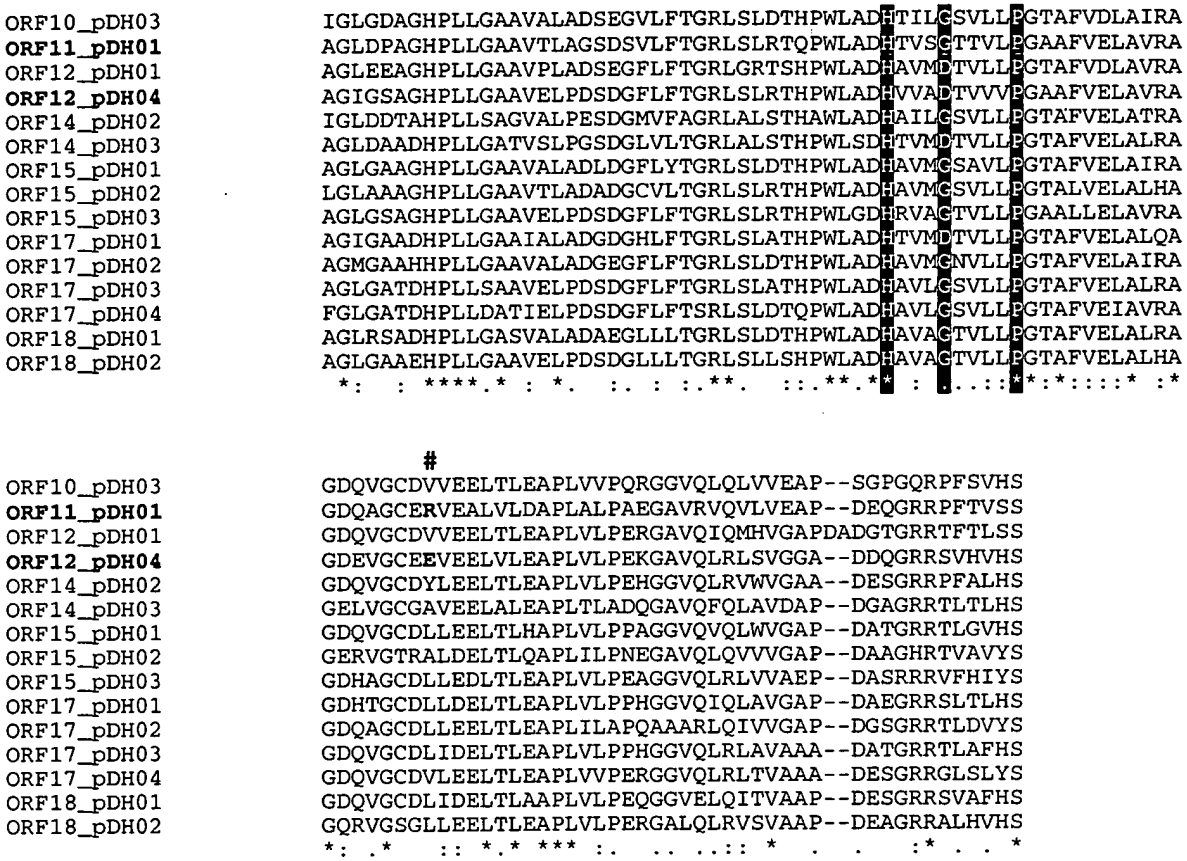
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Figure 5

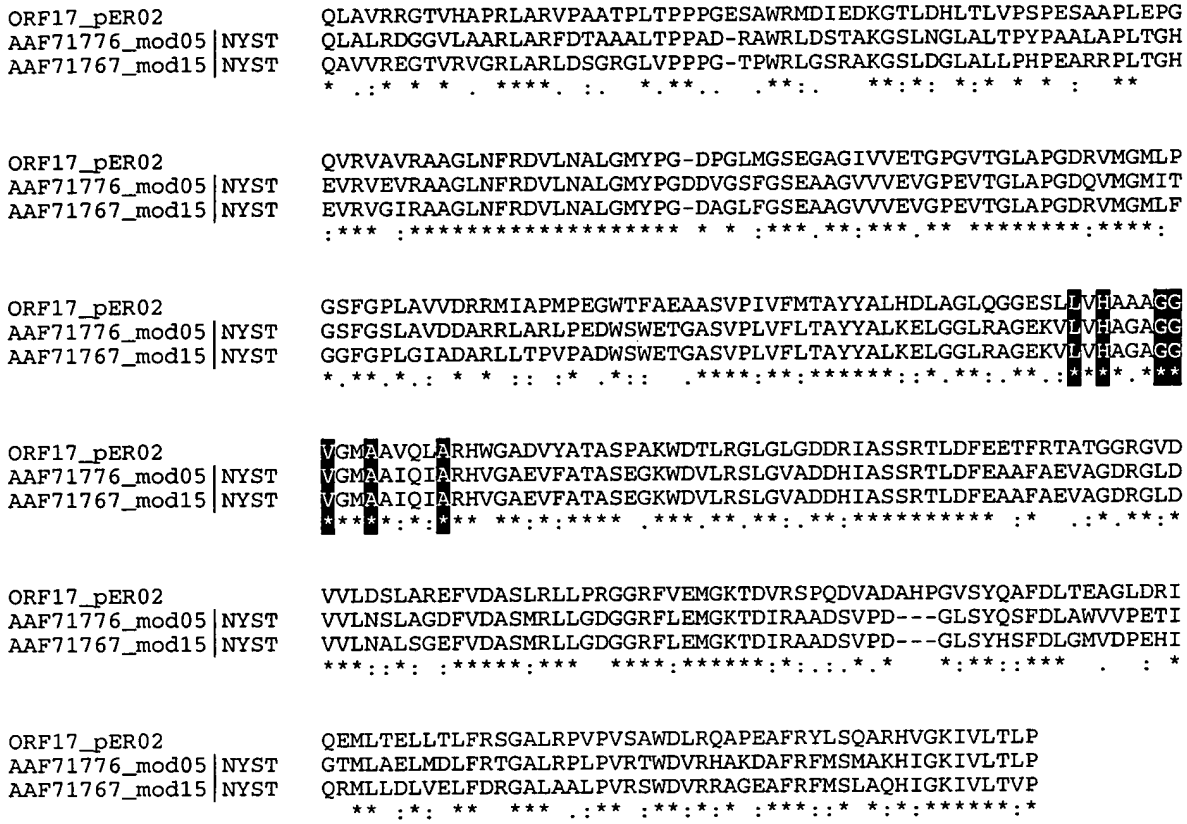
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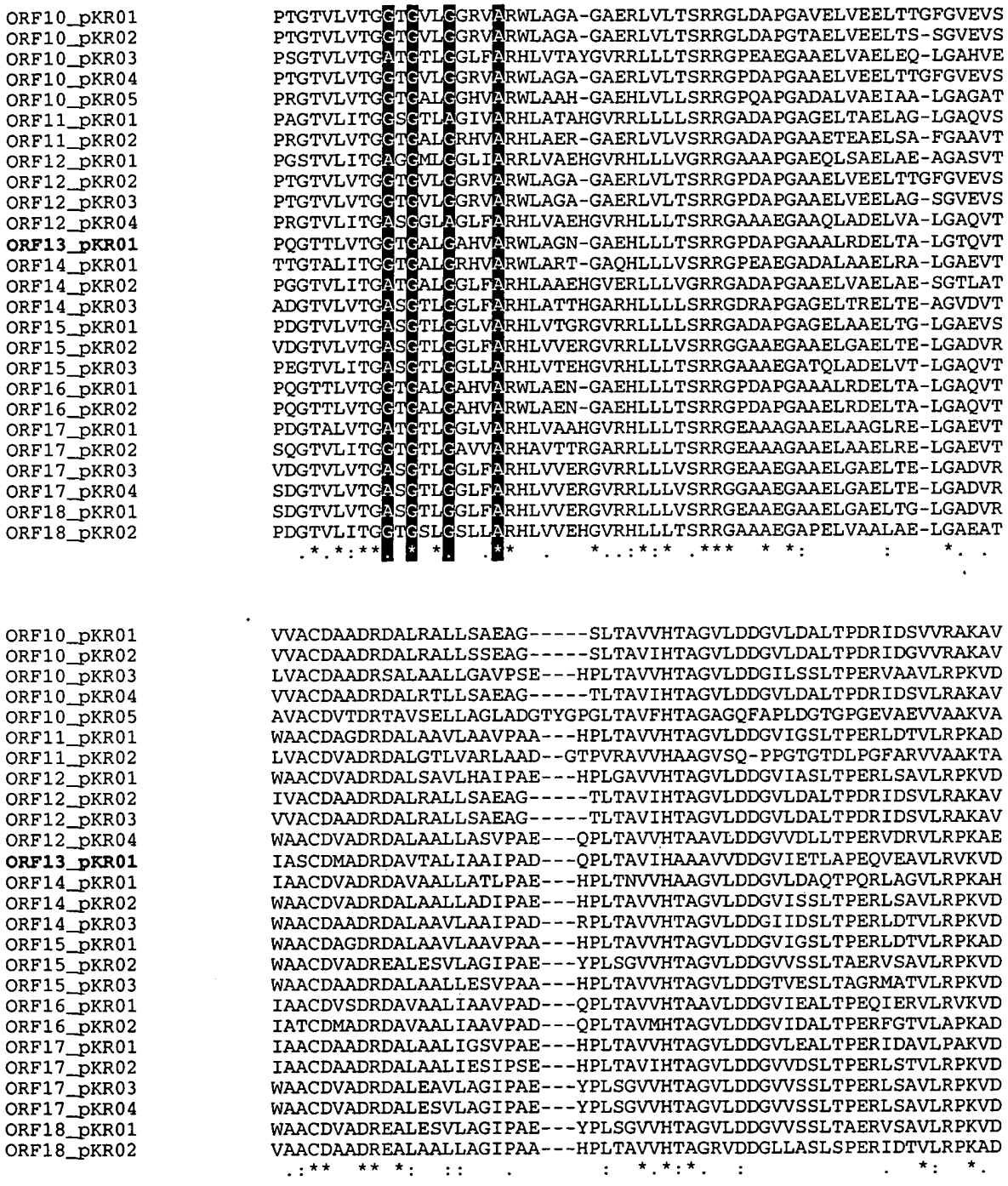
Figure 6a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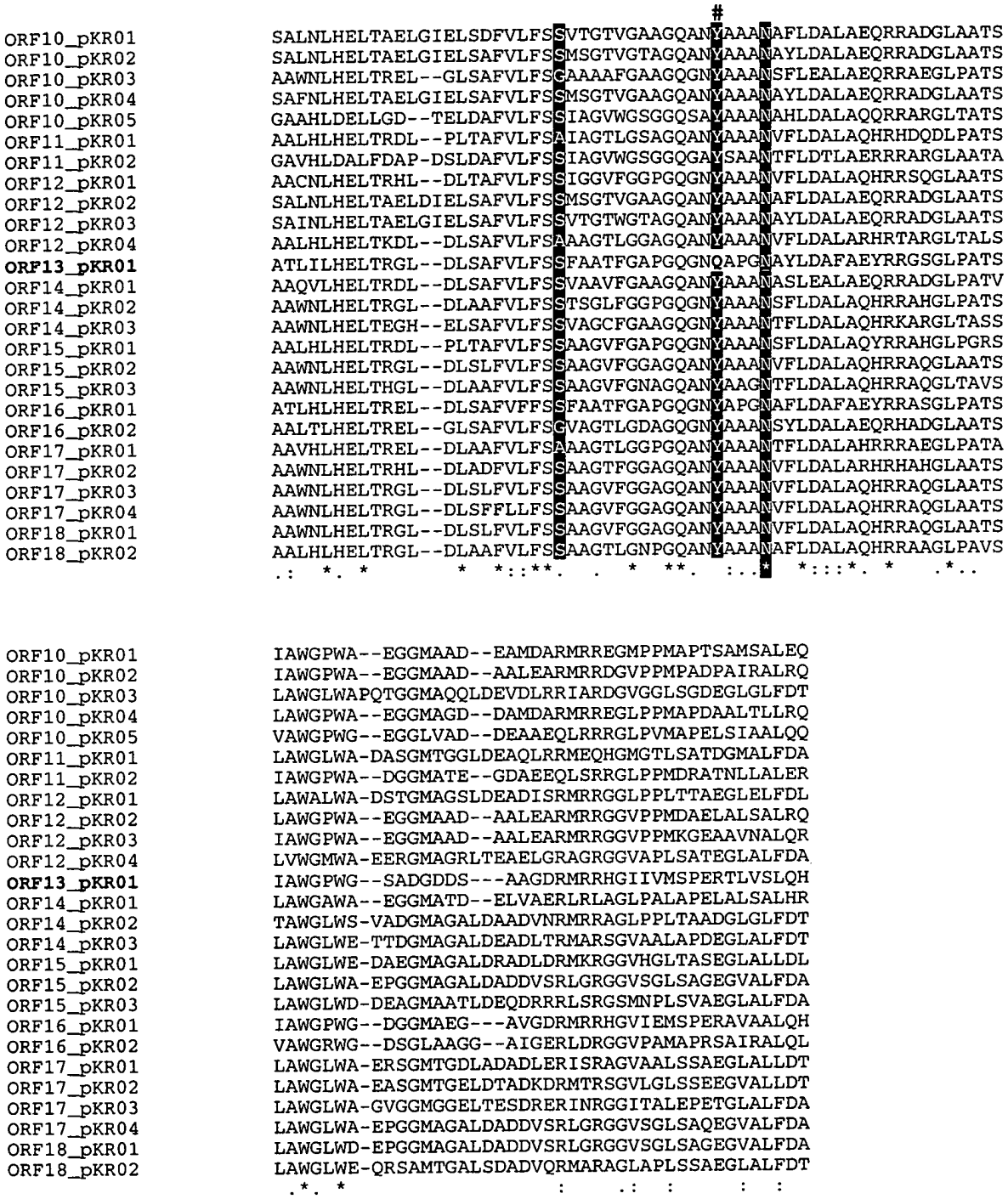
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ORF17_pKR01 LAWGLWA-ERSGMTGDLADADLERISRAGVAALSSAEGLALLDT
ORF17_pKR02 LAWGLWA-EASGMTGELDTADKDRMTRSGVLGLSSEEGVALLDT
ORF17_pKR03 LAWGLWA-GVGGMGGELTESDRERINRGGITALEPETGLALFDA
ORF17_pKR04 LAWGLWA-EPGGMAGALDADDVSRLGRGGVSGLSAQEGVALFDA
ORF18_pKR01 LAWGLWD-EPGGMAGALDADDVSRLGRGGVSGLSAGEGVALFDA
ORF18_pKR02 LAWGLWE-QRSAMTGALSDADVQRMARAGLAPLSSAEGLALFDT

Figure 7

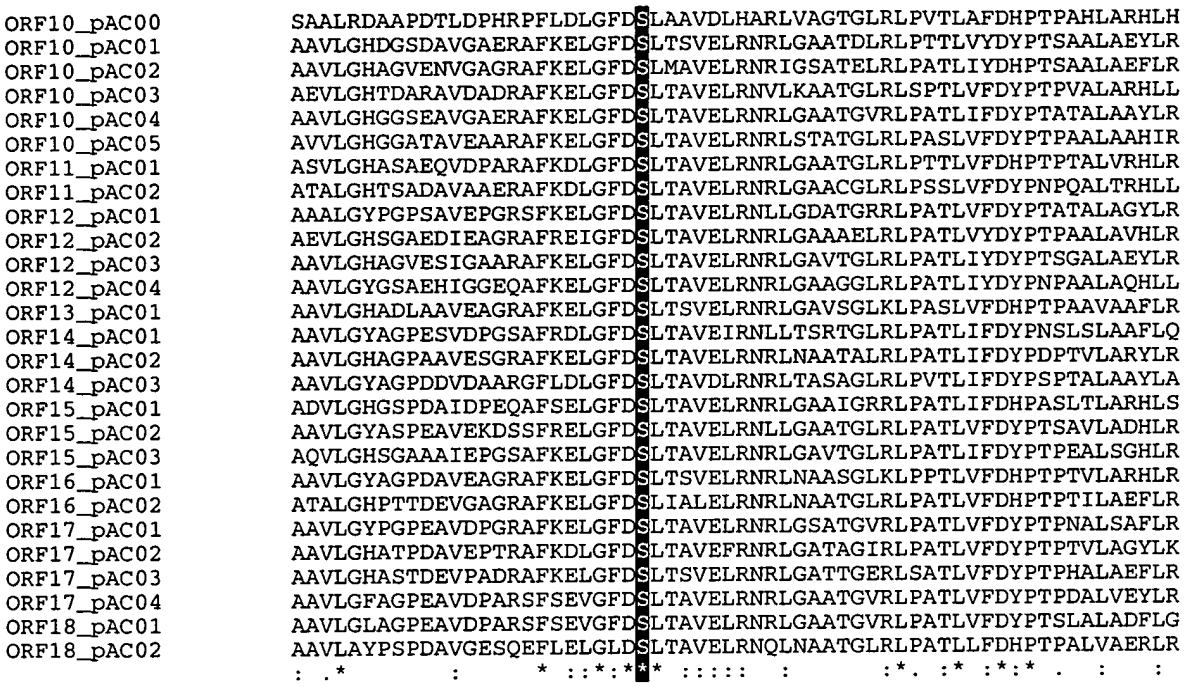

ORF10_pAC00 SAALRDAAPDTLDPHRPFLDLGFDSLAAVDLHARLVAGTGLRLPVTLAFDHPTPAHLARHLH
ORF10_pAC01 AAVLGHDGSDAVGAERAFKELGFDSLTSVELRNRLGAATDLRLPTTLVYDYPTSAALAEYLR
ORF10_pAC02 AAVLGHAGVENVGAGRAFKELGFDSLMAVELRNRIGSATELRLPATLIYDHPTSAALAEFLR
ORF10_pAC03 AEVLGHTDARAVDADRAFKELGFDSLTAVELRNVLKAATGLRLSPTLVFDYPTPVALARHLL
ORF10_pAC04 AAVLGHGGSEAVGAERAFKELGFDSLTAVELRNRLGAATGVRLPATLIFDYPTATALAAYLR
ORF10_pAC05 AVVLGHGGATAVEAARAFKELGFDSLTAVELRNRLSTATGLRLPASLVFDYPTPAALAAHIR
ORF11_pAC01 ASVLGHASAEQVDPARAFKDLGFDSLTAVELRNRLGAATGLRLPTTLVFDHPTPTALVRHLR
ORF11_pAC02 ATALGHTSADAVAAERAFKDLGFDSLTAVELRNRLGAACGLRLPSSLVFDYPNPQALTRHLL
ORF12_pAC01 AAALGYPGPSAVEPGRSFKELGFDSLTAVELRNLLGDATGRRLPATLVFDYPTATALAGYLR
ORF12_pAC02 AEVLGHSGAEDIEAGRAFREIGFDSLTAVELRNRLGAAAELRLPATLVYDYPTPAALAVHLR
ORF12_pAC03 AAVLGHAGVESIGAARAFKELGFDSLTAVELRNRLGAVTGLRLPATLIYDYPTSGALAEYLR
ORF12_pAC04 AAVLGYGSAEHIGGEQAFKELGFDSLTAVELRNRLGAAGGLRLPATLIYDYPNPAALAQHLL
ORF13_pAC01 AAVLGHADLAAVEAGRAFKELGFDSLTSVELRNRLGAVSGLKLPASLVFDHPTPAAVAAFLR
ORF14_pAC01 AAVLGYAGPESVDPGSAFRDLGFDSLTAVEIRNLLTSRTGLRLPATLIFDYPNSLSLAAFLQ
ORF14_pAC02 AAVLGHAGPAAVESGRAFKELGFDSLTAVELRNRLNAATALRLPATLIFDYPDPTVLARYLR
ORF14_pAC03 AAVLGYAGPDDVDAARGFLDLGFDSLTAVDLRNRLTASAGLRLPVTLIFDYPSPTALAAYLA
ORF15_pAC01 ADVLGHGSPDAIDPEQAFSELGFDSLTAVELRNRLGAAIGRRLPATLIFDHPASLTLARHLS
ORF15_pAC02 AAVLGYASPEAVEKDSSFRELGFDSLTAVELRNLLGAATGLRLPATLVFDYPTSAVLADHLR
ORF15_pAC03 AQVLGHSGAAAIEPGSAFKELGFDSLTAVELRNRLGAVTGLRLPATLIFDYPTPEALSGHLR
ORF16_pAC01 AAVLGYAGPDAVEAGRAFKELGFDSLTSVELRNRLNAASGLKLPPTLVFDHPTPTVLARHLR
ORF16_pAC02 ATALGHPTTDEVGAGRAFKELGFDSLIALELRNRLNAATGLRLPATLVFDHPTPTILAEFLR
ORF17_pAC01 AAVLGYPGPEAVDPGRAFKELGFDSLTAVELRNRLGSATGVRLPATLVFDYPTPNALSAFLR
ORF17_pAC02 AAVLGHATPDAVEPTRAFKDLGFDSLTAVEFRNRLGATAGIRLPATLVFDYPTPTVLAGYLK
ORF17_pAC03 AAVLGHASTDEVPADRAFKELGFDSLTSVELRNRLGATTGERLSATLVFDYPTPHALAEFLR
ORF17_pAC04 AAVLGFAGPEAVDPARSFSEVGFDSLTAVELRNRLGAATGVRLPATLVFDYPTPDALVEYLR
ORF18_pAC01 AAVLGLAGPEAVDPARSFSEVGFDSLTAVELRNRLGAATGVRLPATLVFDYPTSLALADFLG
ORF18_pAC02 AAVLAYPSPDAVGESQEFLELGLDSLTAVELRNQLNAATGLRLPATLLFDHPTPALVAERLR

Figure 8

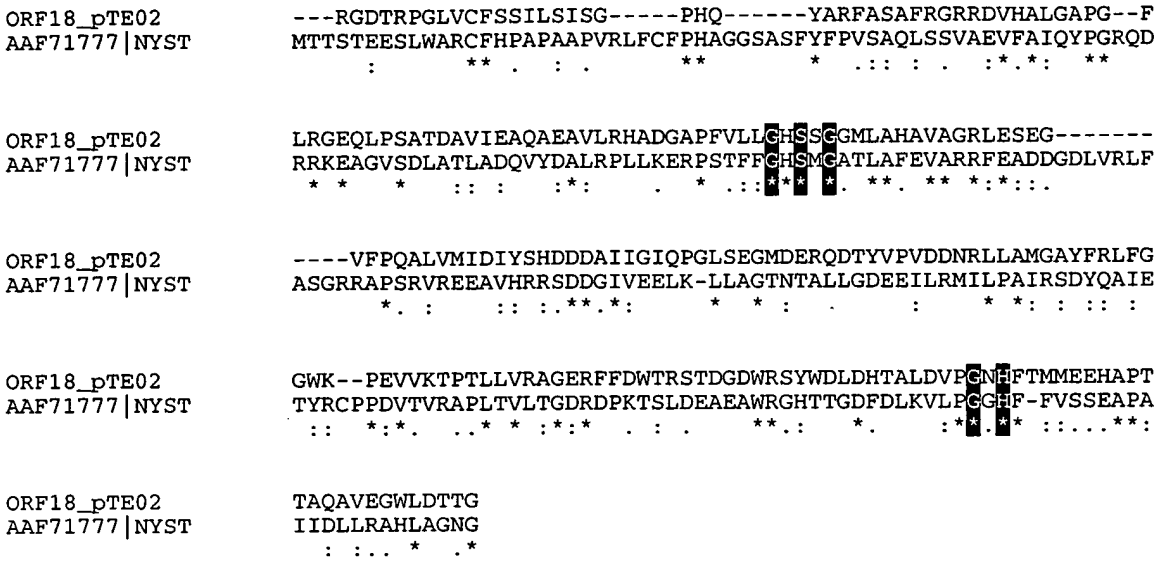

ORF18_pTE02
AAF71777|NYST
---RGDTRPGLVCFSSILSISG-----PHQ------YARFASAFRGRRDVHALGAPG--F
MTTSTEESLWARCFHPAPAAPVRLFCFPHAGGSASFYFPVSAQLSSVAEVFAIQYPGRQD
LRGEQLPSATDAVIEAQAEAVLRHADGAPFVLLGHSSGGMLAHAVAGRLESEG-------
RRKEAGVSDLATLADQVYDALRPLLKERPSTFFGHSMGATLAFEVARRFEADDGDLVRLF
----VFPQALVMIDIYSHDDDAIIGIQPGLSEGMDERQDTYVPVDDNRLLAMGAYFRLFG
ASGRRAPSRVREEAVHRRSDDGIVEELK-LLAGTNTALLGDEEILRMILPAIRSDYQAIE
GWK--PEVVKTPTLLVRAGERFFDWTRSTDGDWRSYWDLDHTALDVPGNHFTMMEEHAPT
TYRCPPDVTVRAPLTVLTGDRDPKTSLDEAEAWRGHTTGDFDLKVLPGGHF-FVSSEAPA
TAQAVEGWLDTTG
IIDLLRAHLAGNG

Figure 9

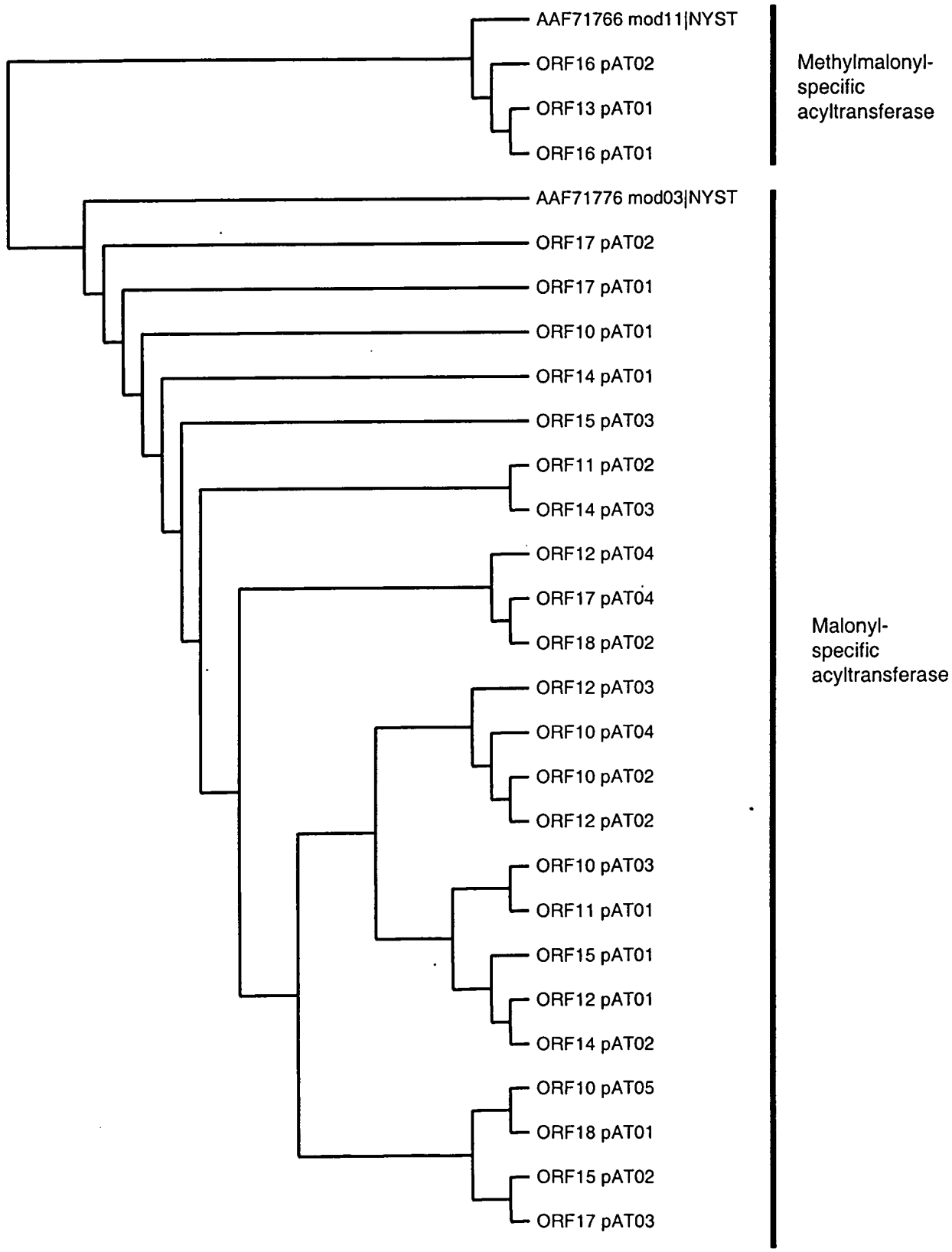

AAF71766 mod11|NYST
ORF16 pAT02
ORF13 pAT01
ORF16 pAT01
Methylmalonyl-specific acyltransferase
AAF71776 mod03|NYST
ORF17 pAT02
ORF17 pAT01
ORF10 pAT01
ORF14 pAT01
ORF15 pAT03
ORF11 pAT02
ORF14 pAT03
ORF12 pAT04
ORF17 pAT04
ORF18 pAT02
ORF12 pAT03
ORF10 pAT04
ORF10 pAT02
ORF12 pAT02
ORF10 pAT03
ORF11 pAT01
ORF15 pAT01
ORF12 pAT01
ORF14 pAT02
ORF10 pAT05
ORF18 pAT01
ORF15 pAT02
ORF17 pAT03
Malonyl-specific acyltransferase

Figure 10

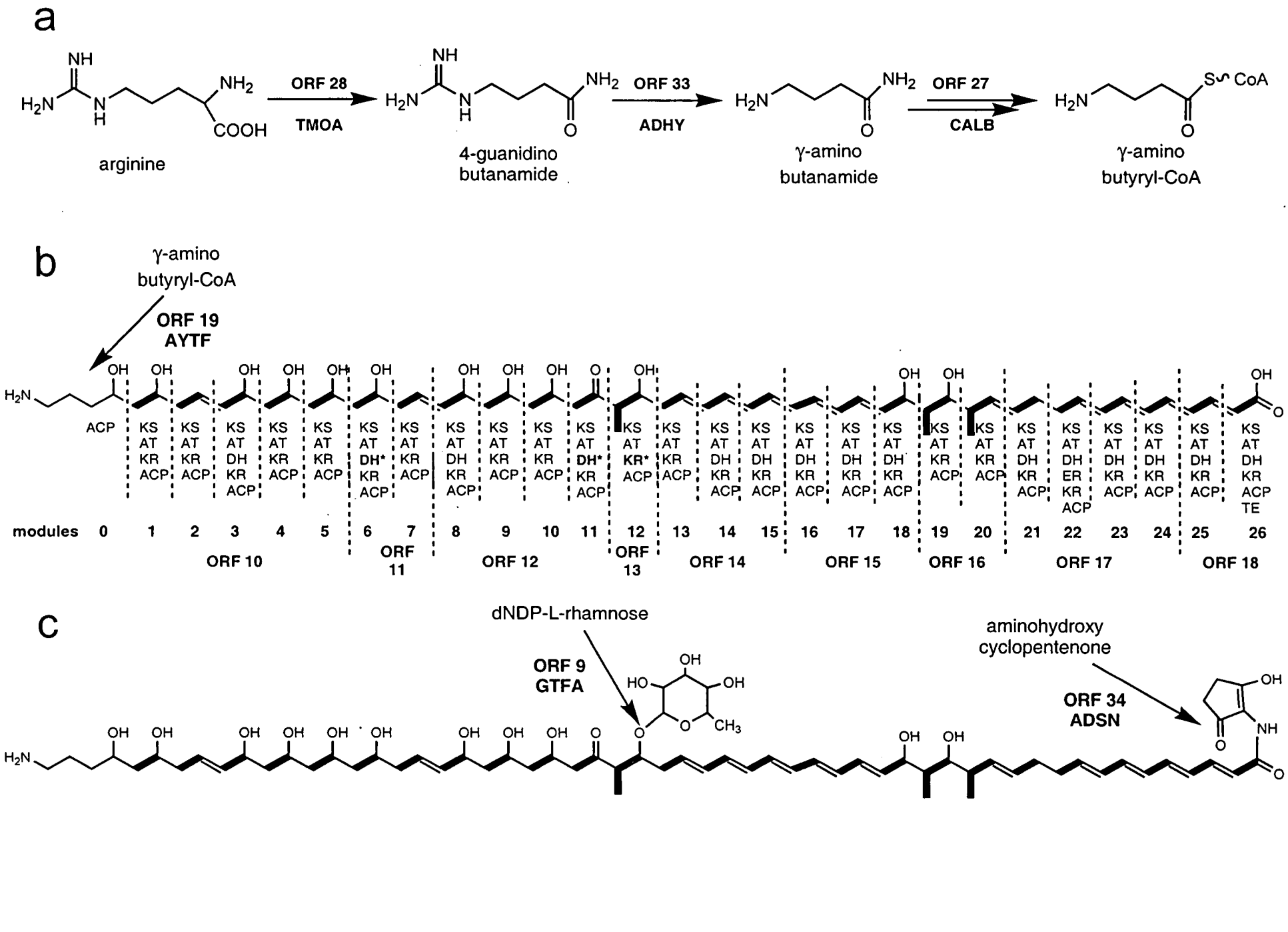
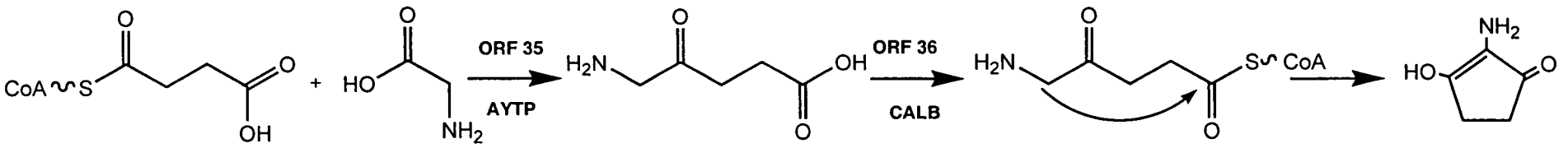

a
arginine
ORF 28
TMOA
4-guanidino butanamide
ORF 33
ADHY
γ-amino butanamide
ORF 27
CALB
γ-amino butyryl-CoA
b
γ-amino butyryl-CoA
ORF 19
AYTF
ACP
modules 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
ORF 10
ORF 11
ORF 12
ORF 13
ORF 14
ORF 15
ORF 16
ORF 17
ORF 18
c
dNDP-L-rhamnose
ORF 9
GTFA
aminohydroxy cyclopentenone
ORF 34
ADSN

Figure 11

a



succinyl-CoA glycine 5-aminolevulinate 5-aminolevulinate-CoA aminohydroxy cyclopentenone

b

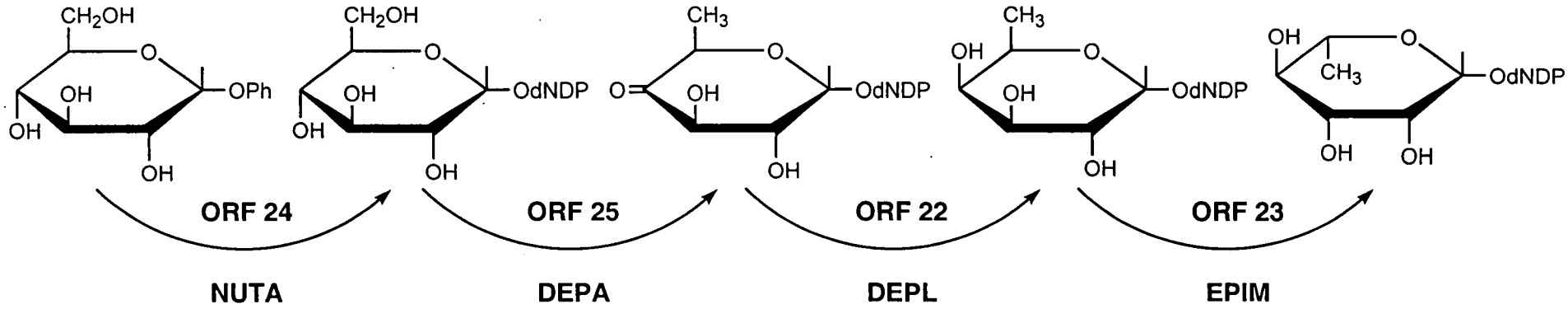


Figure 12a

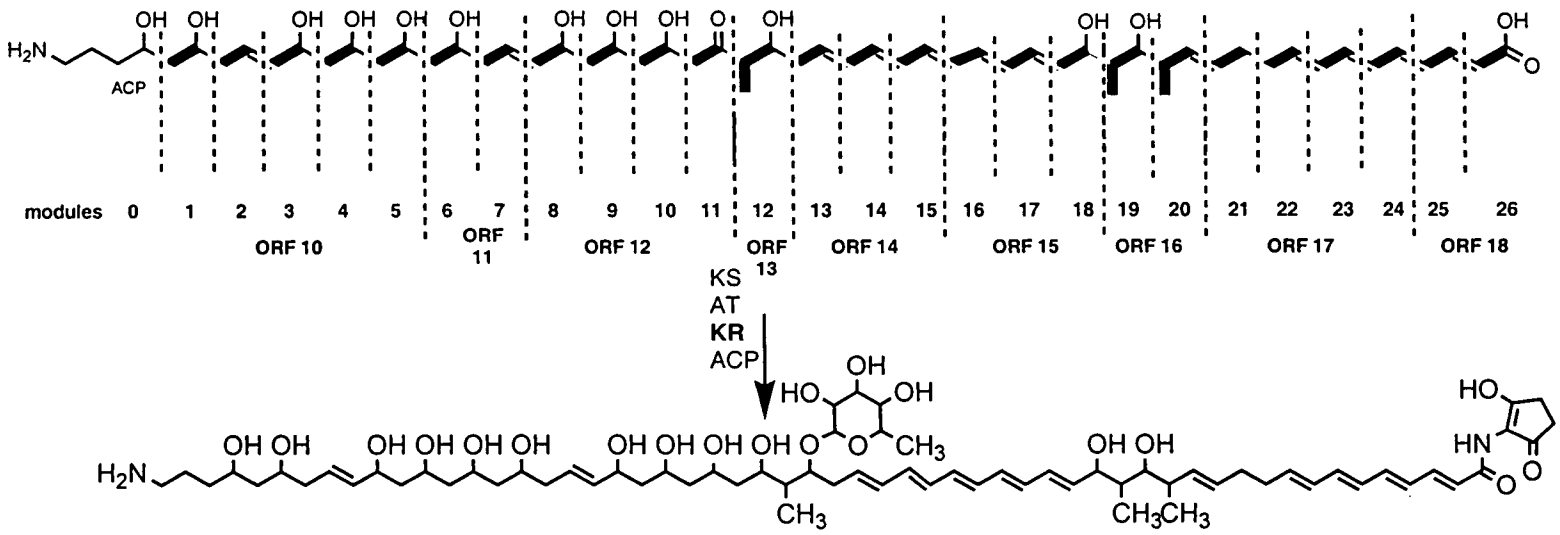


Figure 12b

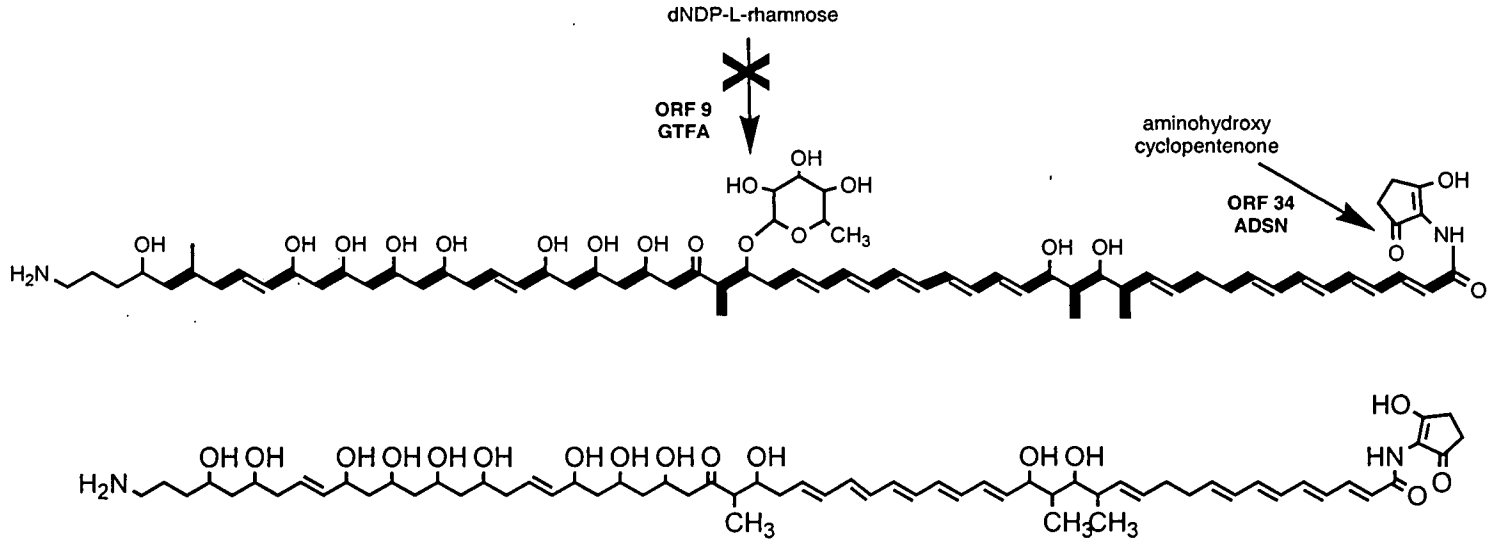


Figure 12c

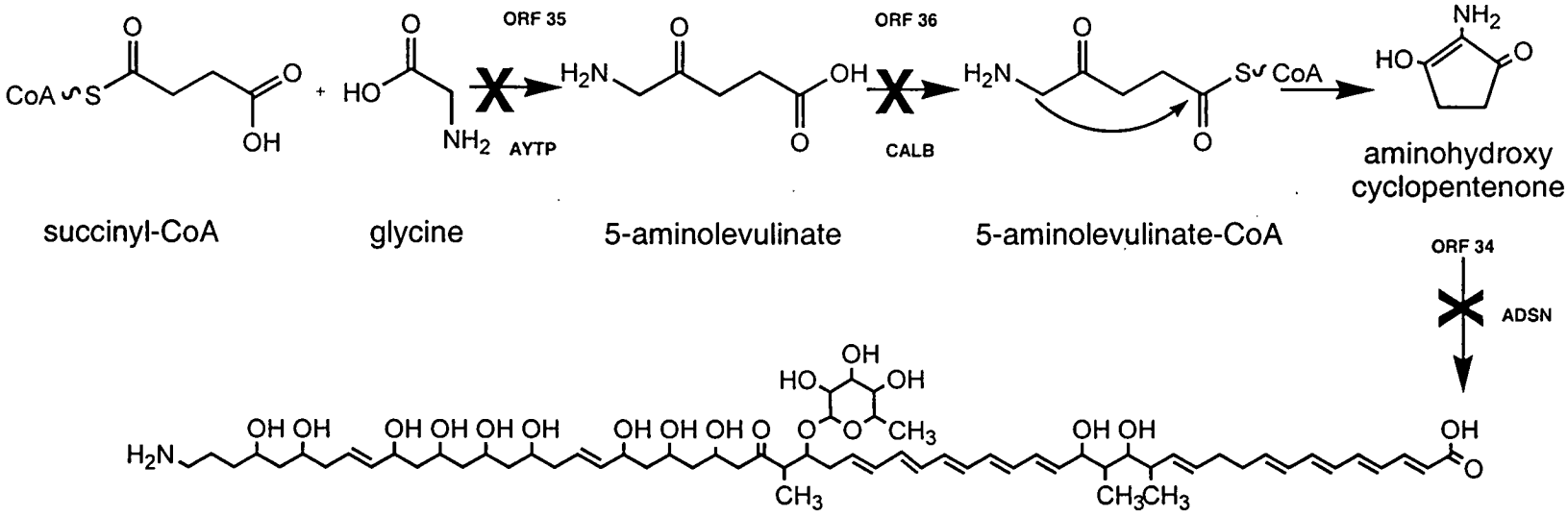


Figure 12d

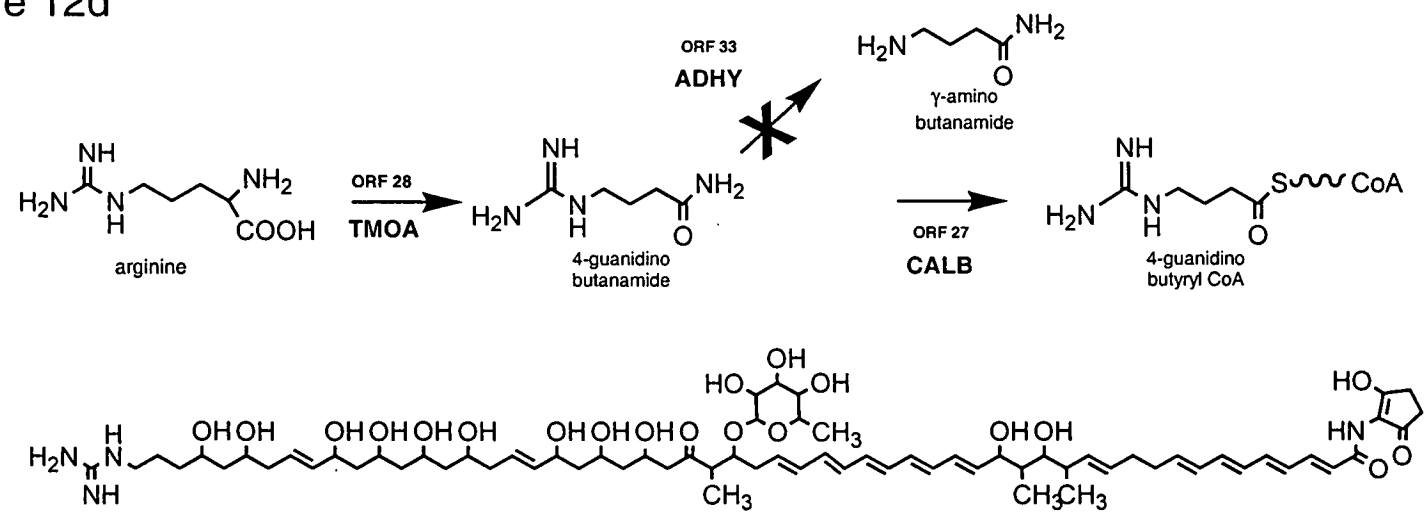


Figure 12e

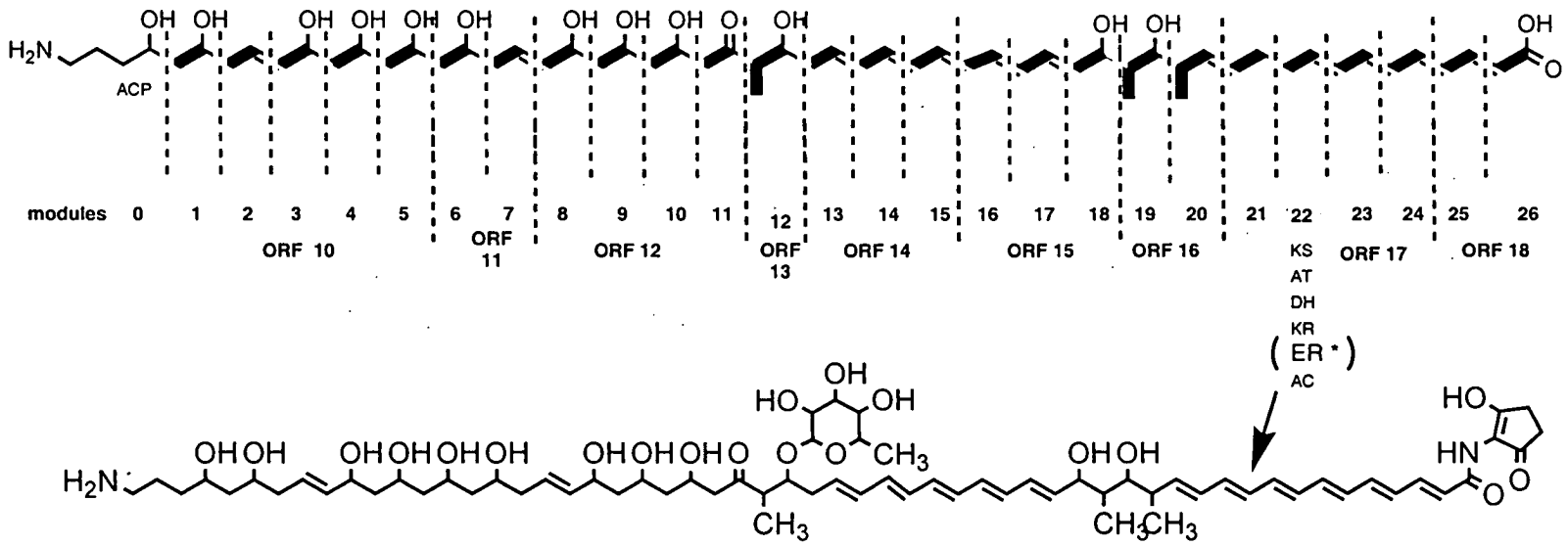
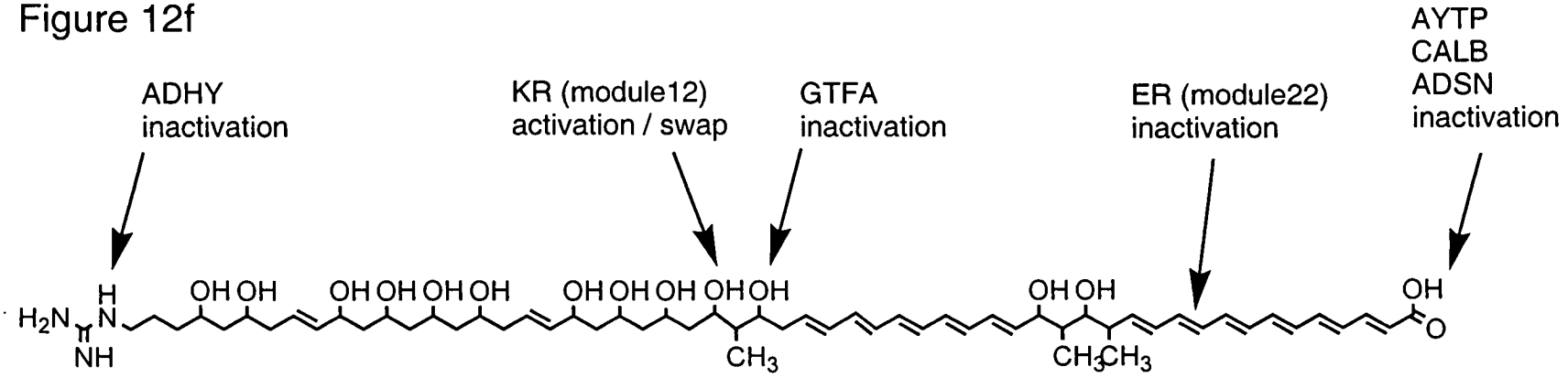


Figure 12f



023X04QB1_R1

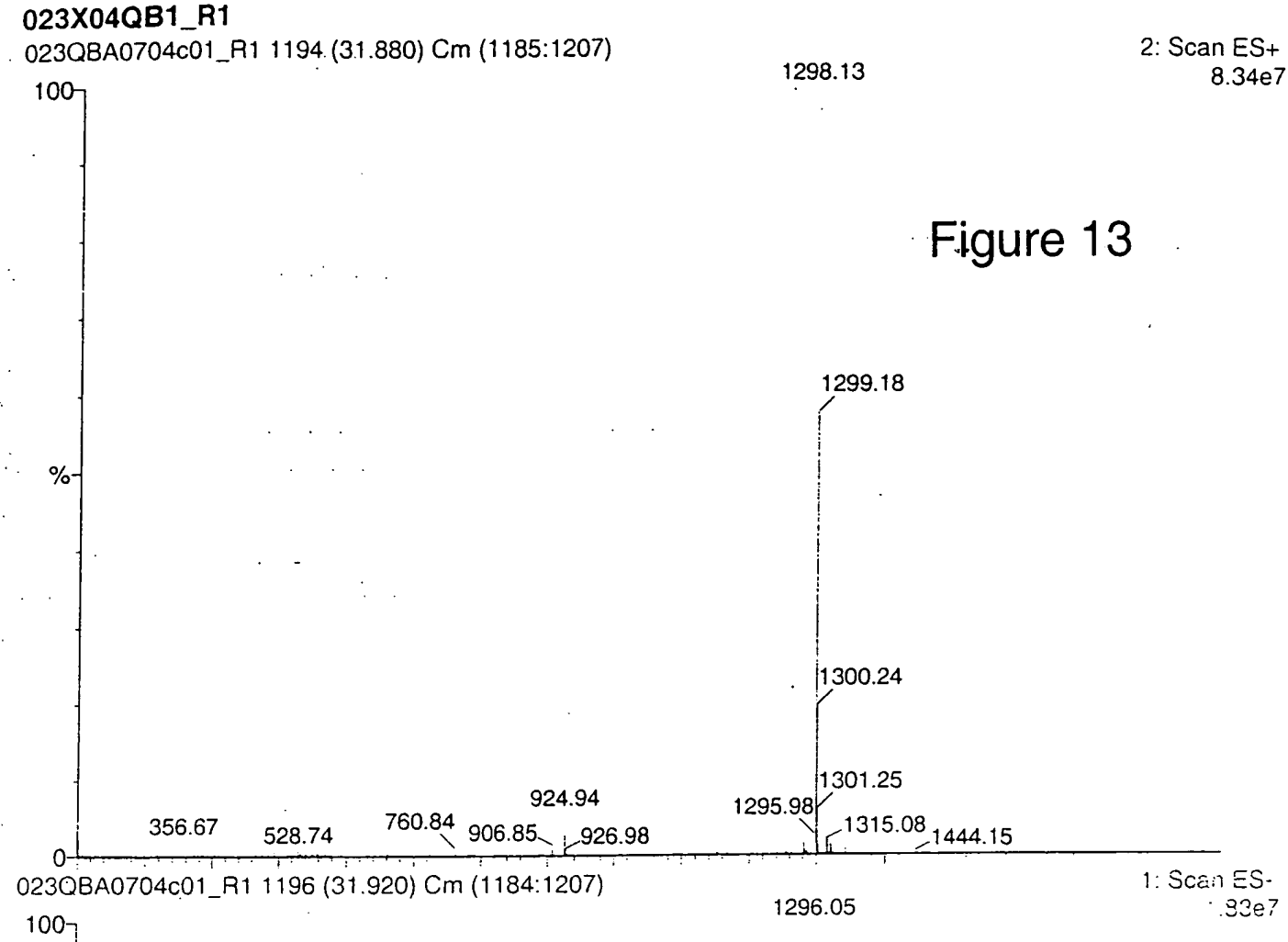
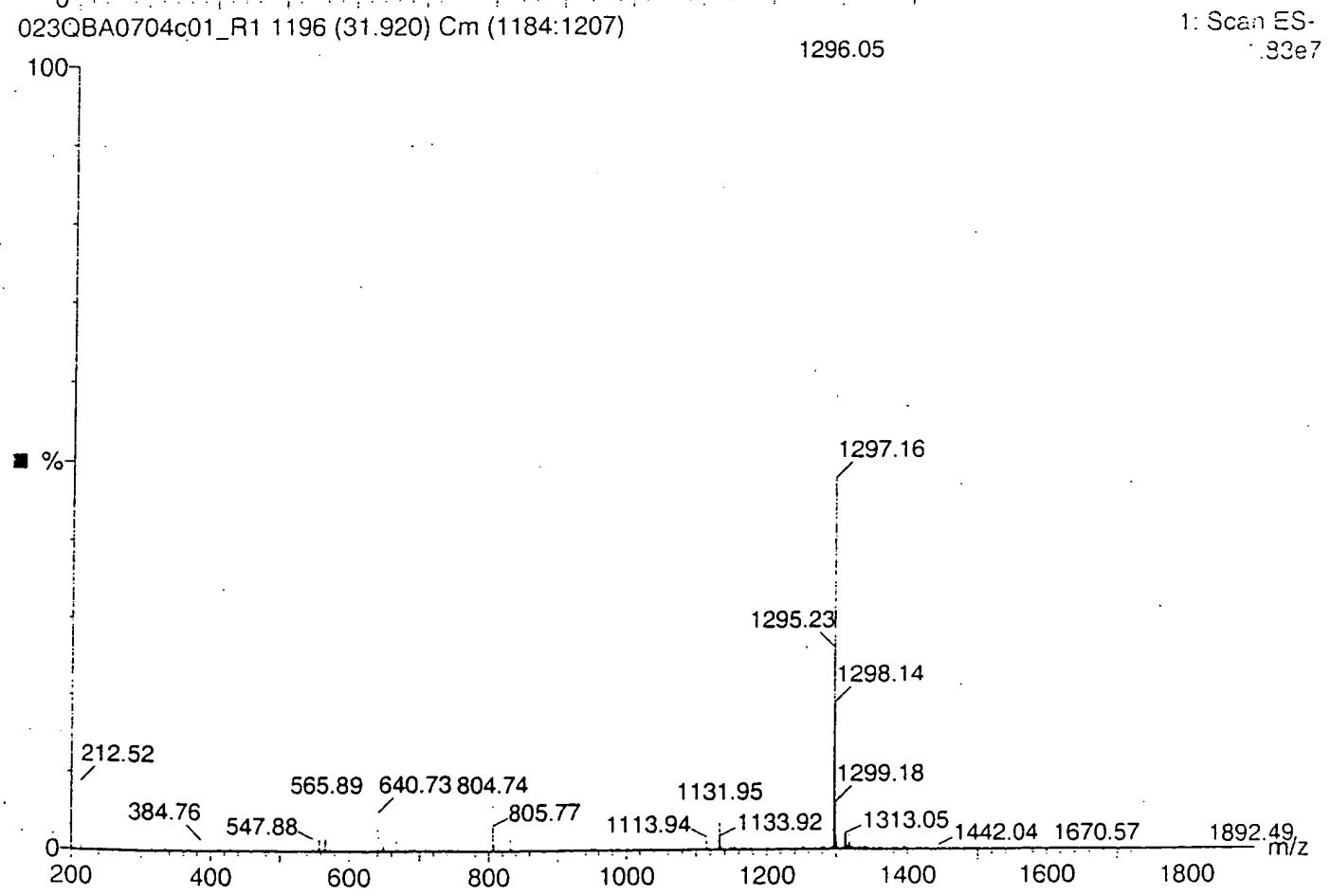


Figure 13



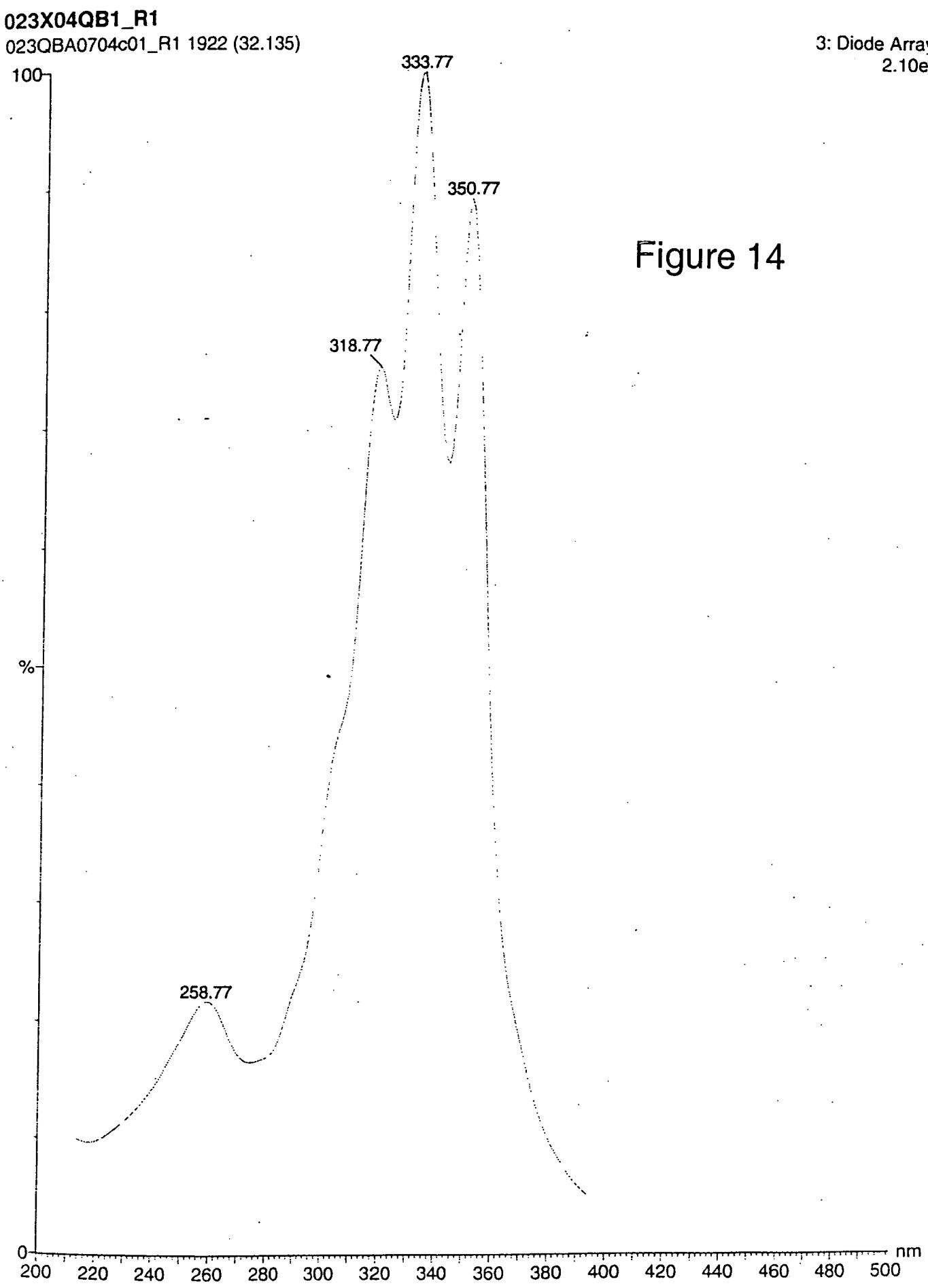

023X04QB1_R1
023QBA0704c01_R1 1922 (32.135)
3: Diode Array
2.10e6
333.77
350.77
318.77
258.77
100
%
0
200
220
240
260
280
300
320
340
360
380
400
420
440
460
480
500
nm

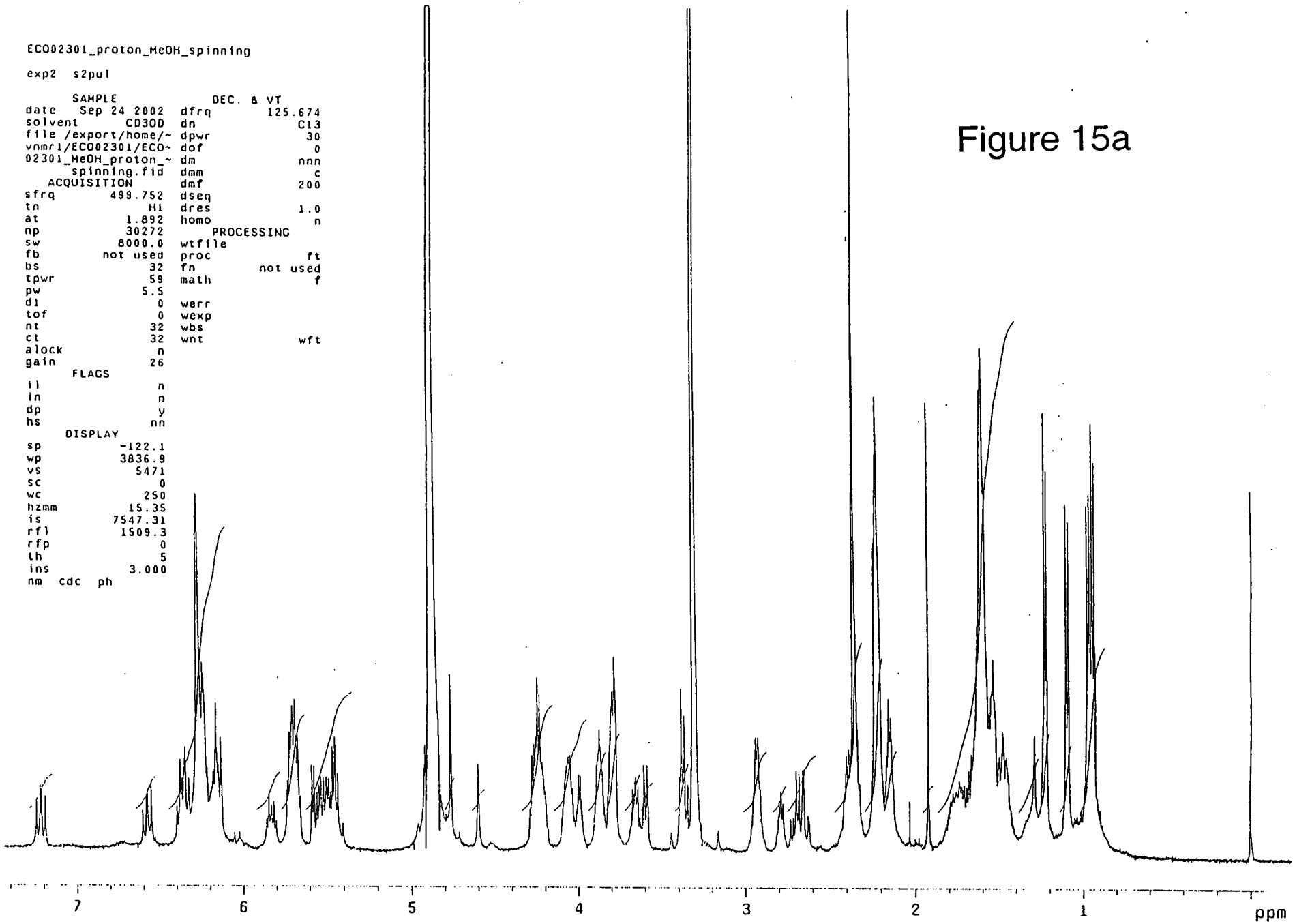
Figure 14

ECO02301_proton_MeOH_spinning

exp2 s2pul

SAMPLE		DEC. & VT	
date	Sep 24 2002	dfrq	125.674
solvent	CD3OD	dn	C13
file	/export/home/~	dpwr	30
vnmr1/ECO02301/ECO~		dof	0
02301_MeOH_proton_~		dm	nnn
spinning.fid		dmm	c
ACQUISITION		dmf	200
sfrq	499.752	dseq	
tn	H1	dres	1.0
at	1.892	homo	n
np	30272	PROCESSING	
sw	8000.0	wtfile	
fb	not used	proc	ft
bs	32	fn	not used
tpwr	59	math	f
pw	5.5		
d1	0	werr	
tof	0	wexp	
nt	32	wbs	
ct	32	wnt	wft
alock	n		
gain	26		
FLAGS			
il	n		
in	n		
dp	y		
hs	nn		
DISPLAY			
sp	-122.1		
wp	3836.9		
vs	5471		
sc	0		
wc	250		
hzmm	15.35		
is	7547.31		
rfl	1509.3		
rfp	0		
th	5		
ins	3.000		
nm cdc ph			

Figure 15a



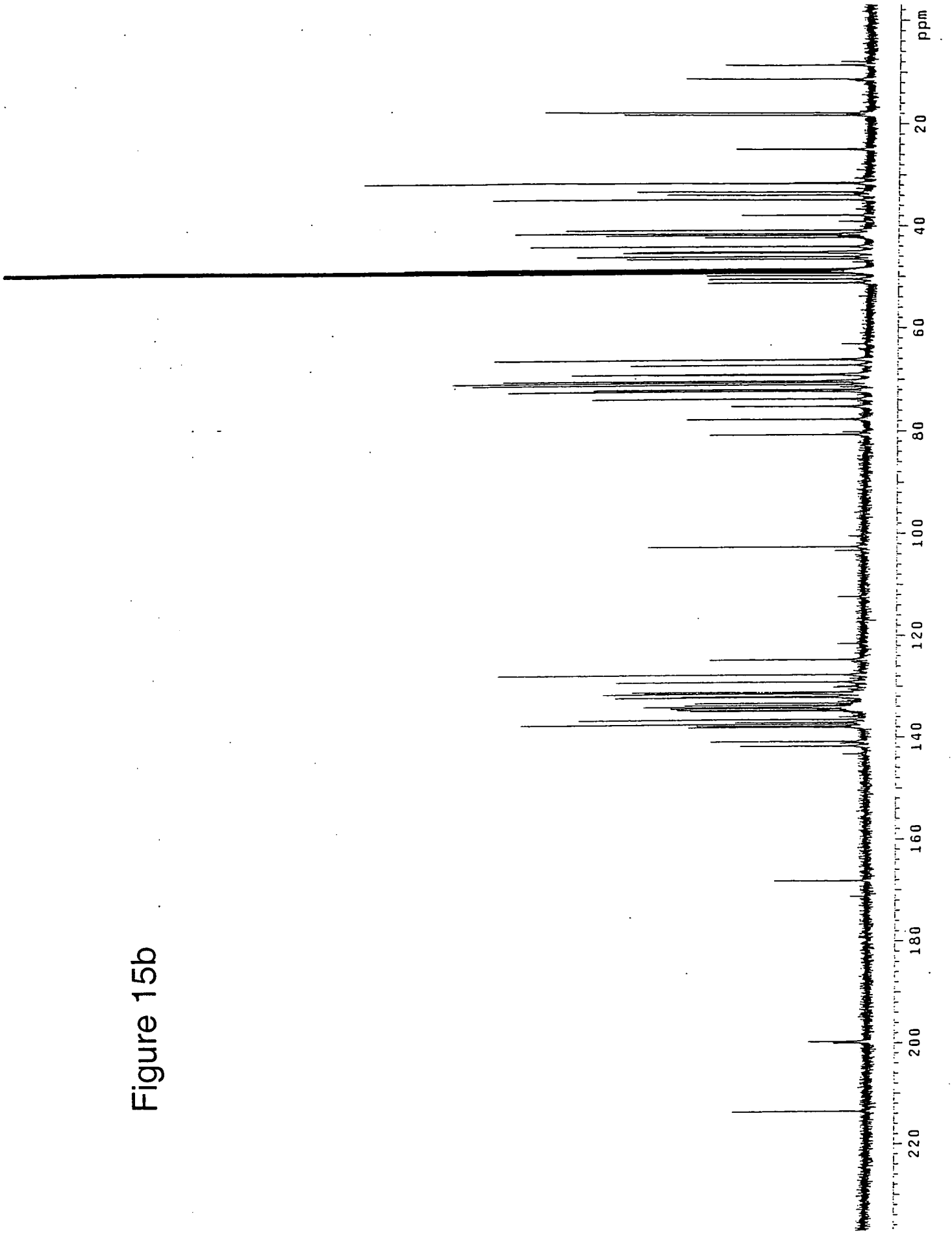


Figure 15b

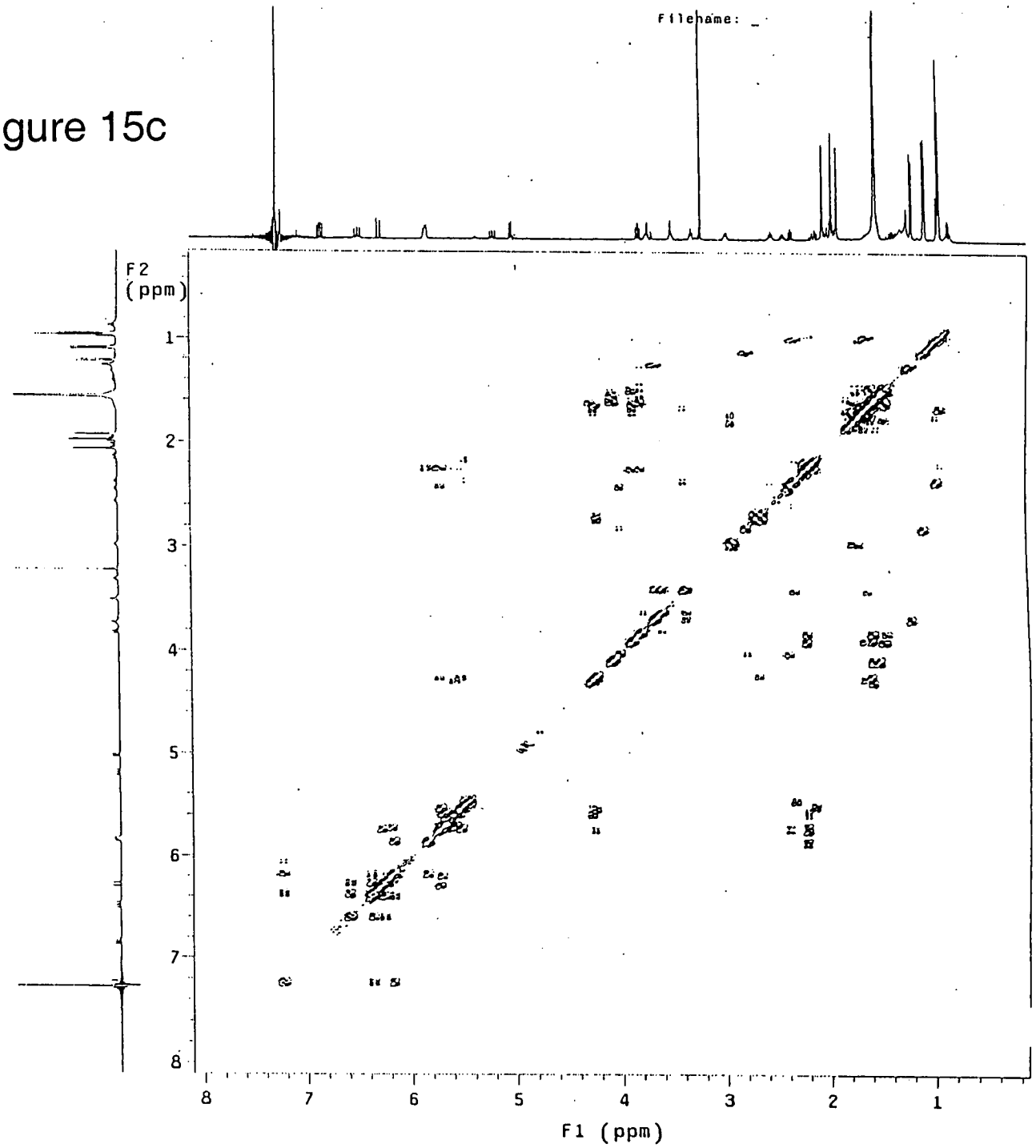
STANDARD PROTON PARAMETERS

Pulse Sequence: gDQCOSY

Solvent: CD3OD
Ambient temperature
File: ECO_02301_gDQCOSY_CD3OD_high_res
INOVA-500 "resonance"

Relax. delay 1.000 sec
Acq. time 0.128 sec
Width 3988.0 Hz
2D Width 3988.0 Hz
32 repetitions
2 x 500 increments
OBSERVE H1, 499.7495714 MHz
DATA PROCESSING
Sq. sine bell 0.096 sec
Shifted by -0.064 sec
F1 DATA PROCESSING
Sq. sine bell 0.037 sec
Shifted by -0.025 sec
FT size 8192 x 8192
Total time 10 hr, 48 min, 6 sec

Figure 15c



STANDARD PROTON PARAMETERS

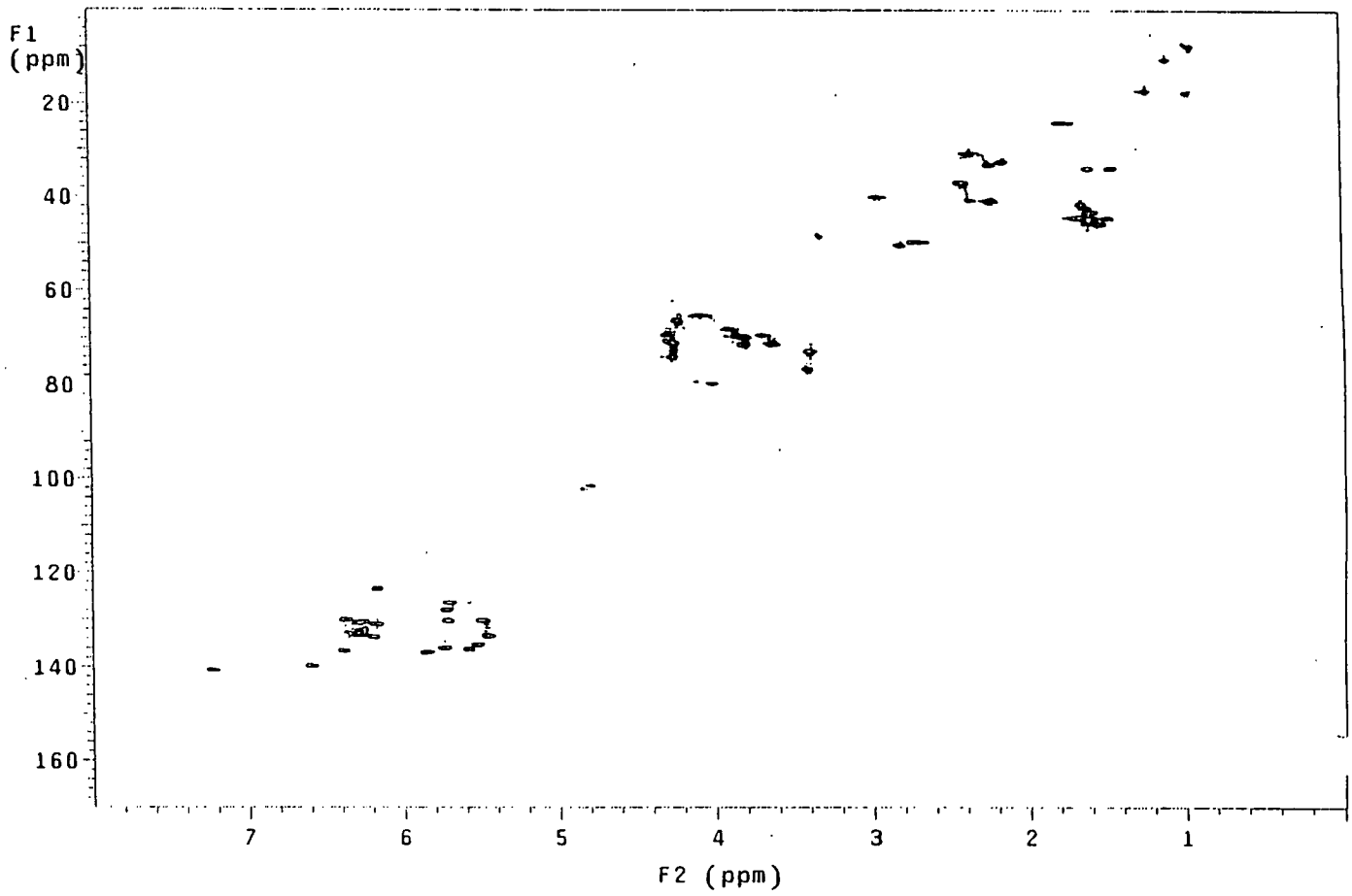
Pulse Sequence: gHSQC

Solvent: CD3OD
Ambient temperature
File: ECO-02301_CD3OD_gHSQC_12_02
INOVA-500 "resonance"

Relax. delay 1.000 sec
Acq. time 0.128 sec
Width 4001.6 Hz
2D Width 21361.8 Hz
64 repetitions
2 x 128 increments
OBSERVE H1, 499.7495714 MHz
DECOUPLE C13, 125.6727810 MHz
Power 40 dB
on during acquisition
off during delay
W40_id4719 modulated
DATA PROCESSING
Gauss apodization 0.059 sec
F1 DATA PROCESSING
Gauss apodization 0.022 sec
FT size 2048 x 2048
Total time 5 hr, 28 min, 9 sec

Filename: _

Figure 15d



STANDARD PROTON PARAMETERS

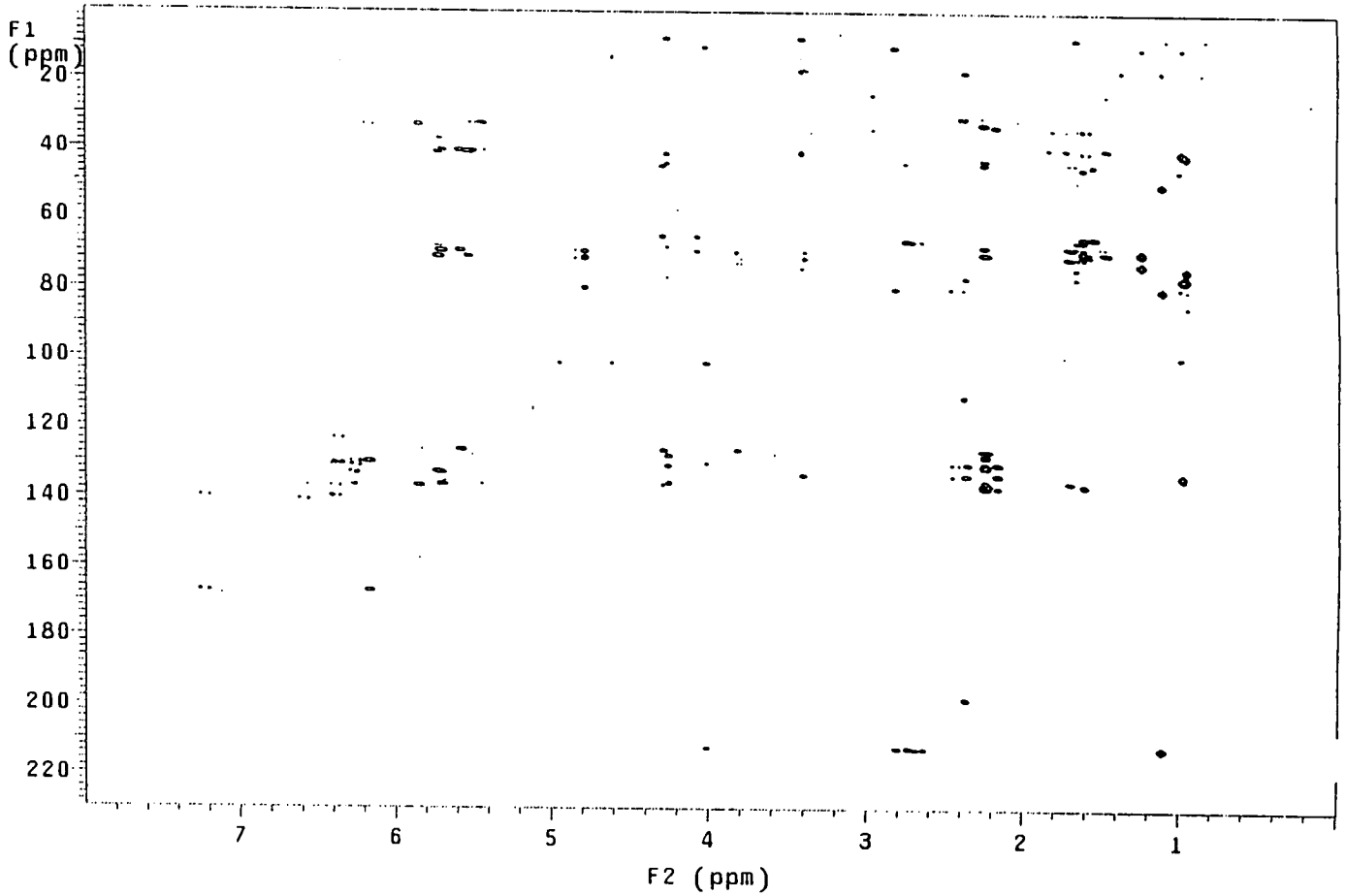
Pulse Sequence: gHMBC

Solvent: CD3OD
Ambient temperature
File: ECO02301_CD3OD_gHMBC_12_02
INOVA-500 "resonance"

Relax. delay 1.000 sec
Acq. time 0.128 sec
Width 4001.6 Hz
20 Width 28901.7 Hz
128 repetitions
400 increments
OBSERVE H1, 499.7495714 MHz
DATA PROCESSING
Sine bell 0.064 sec
F1 DATA PROCESSING
Sine bell 0.007 sec
FT size 2048 x 4096
Total time 17 hr, 18 min, 49 sec

Filename: _

Figure 15e



STANDARD PROTON PARAMETERS

Pulse Sequence: TOCSY

Solvent: CD3OD
Ambient temperature
File: 02301_CD3OD_TOCSY_mix_08
INOVA-500 "resonance"

Relax. delay 1.000 sec
Mixing 0.080 sec
Acq. time 0.128 sec
Width 4001.6 Hz
2D Width 4001.6 Hz
32 repetitions
2 x 200 increments
OBSERVE H1, 499.7495714 MHz
DATA PROCESSING
Gauss apodization 0.059 sec
F1 DATA PROCESSING
Gauss apodization 0.046 sec
FT size 2048 x 2048
Total time 4 hr, 29 min, 30 sec

Filename: _

Figure 15f

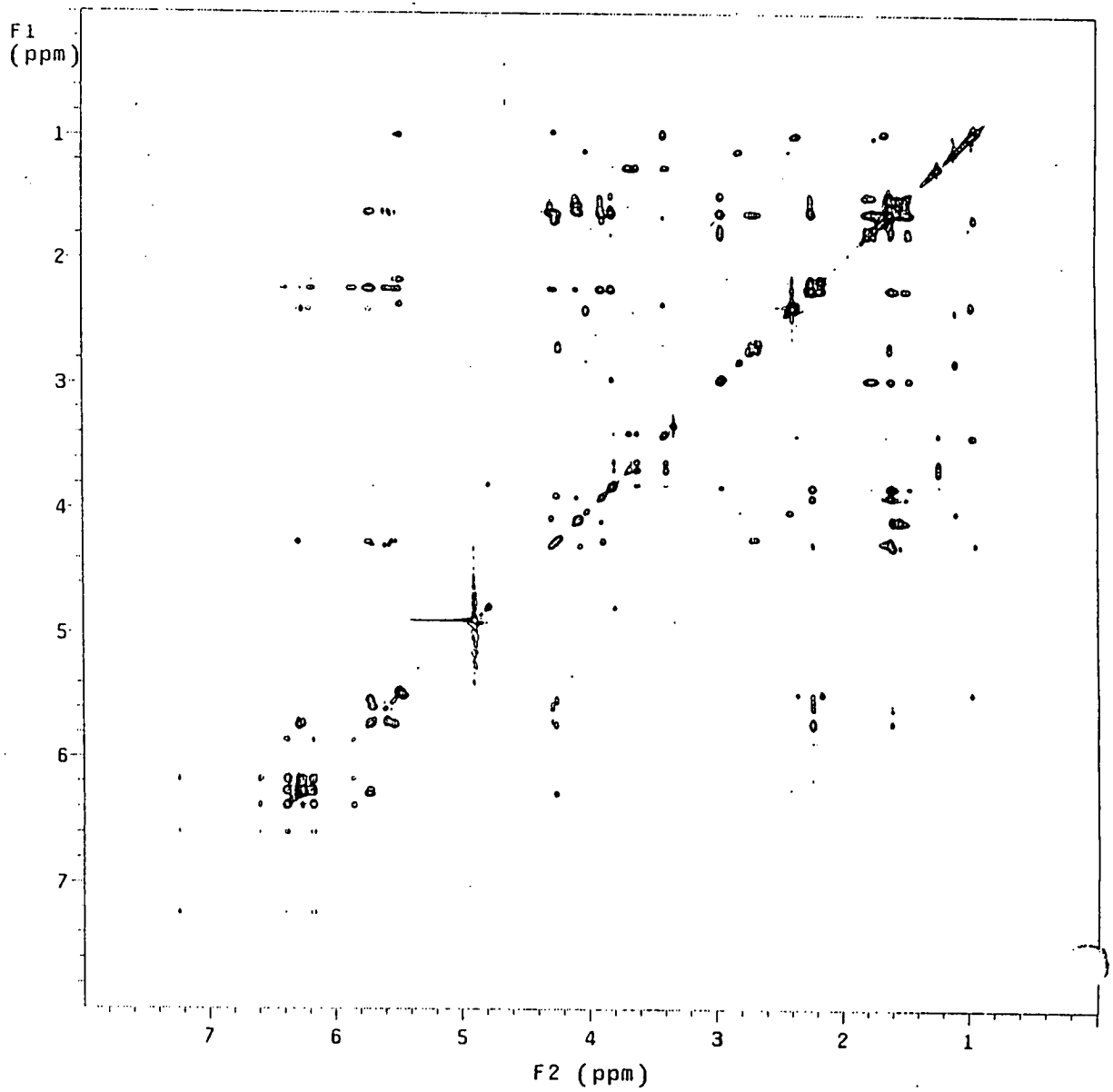


Figure 16

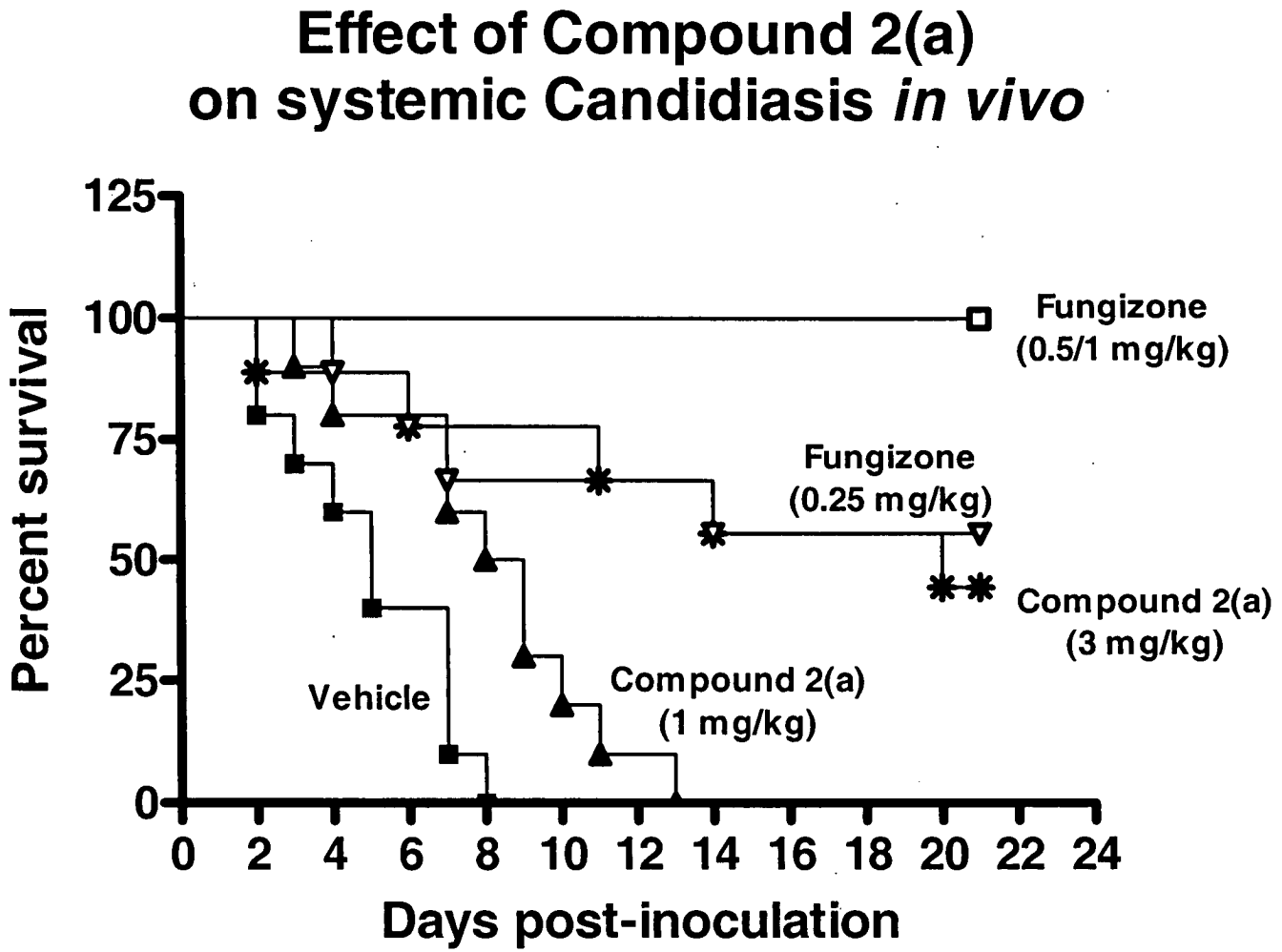

Effect of Compound 2(a)
on systemic Candidiasis *in vivo*
Percent survival
125
100
75
50
25
0
0 2 4 6 8 10 12 14 16 18 20 22 24
Days post-inoculation
Fungizone
(0.5/1 mg/kg)
Fungizone
(0.25 mg/kg)
Compound 2(a)
(3 mg/kg)
Compound 2(a)
(1 mg/kg)
Vehicle

Figure 17a

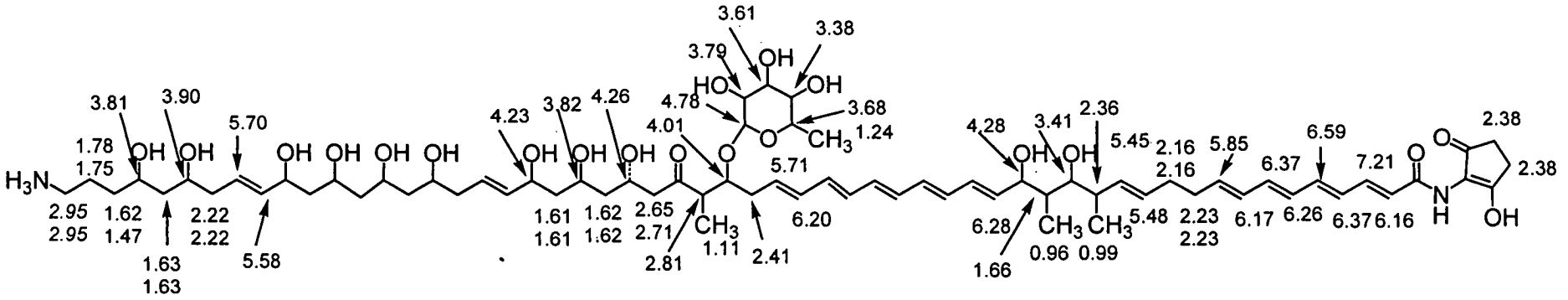
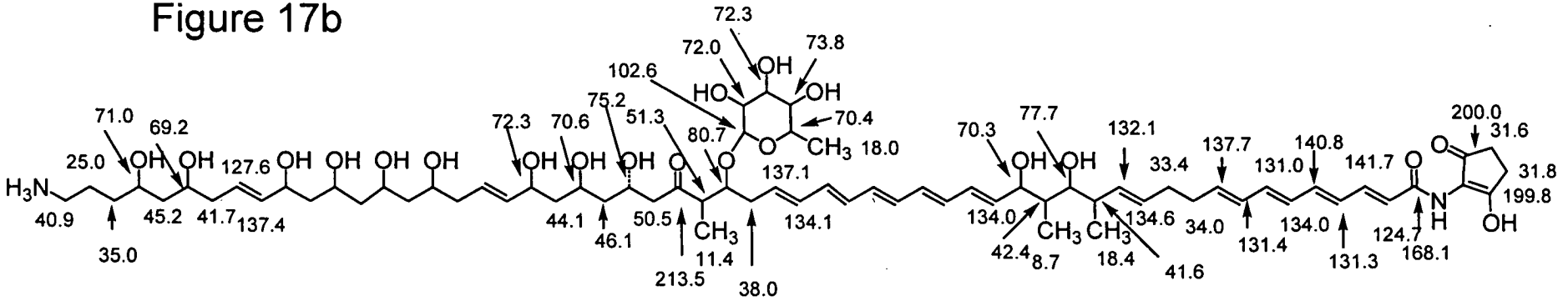



Figure 17b